ARCHIVES OF OPHTHALMOLOGY.

APLASIA OF THE PAPILLA AND RETINAL VESSELS WITH A PECULIAR ANOMALY AT THE MACULA IN EYES OTHERWISE NORMAL.

By Dr. ALEXANDER DUANE, New York.

(*With two text-figures.*)

THE following case seems worthy of record:

Fred R., aged two and one-half years, was brought to the Cornell Dispensary, December 5, 1902. At age of three months it was noticed that child paid no attention to objects waved before the eyes, and since that time has never seemed to see anything. Other senses good. Hearing in particular is keen, and child discriminates tunes and is fond of music. Physical development in general good, although child can neither stand nor walk. Mental development said to be equal to the ordinary. Temper and disposition good.

No illnesses of any kind. No convulsions except one attack during teething at age of one.

Patient when first examined restless, and made continual purposeful movements of head, arms, hands, and legs. When seen at other times was quiet.

Both eyes make searching to-and-fro movements, and besides show a constant, very slight, but rapid nystagmus, mainly vertical in direction.

Apparently no perception of light. Winks at times when light is thrown into eyes, but at other times does not, and seems not to follow the light.

Eyes normal in size. Sclera, cornea, iris, and lens normal. Pupils moderately wide and equal. No light-reaction.

Large floating opacities in vitreous of left eye; none in right.

Discs in both eyes irregularly oval; are of a uniform dirty white, devoid of markings, and look flat and inconspicuous. The papillary vessels are limited to two very slender twigs, arising in each eye from the centre of the disc and running respectively up and down to the border of the disc. Those of the left eye (Fig. 2) cannot be traced beyond the disc; those of the right eye (Fig. 1), which can be followed a little way into the retina, all appear to bend away to the nasal side.

Except for these twigs, *no vessels, either retinal or choroidal, are to be seen in the entire fundus.*

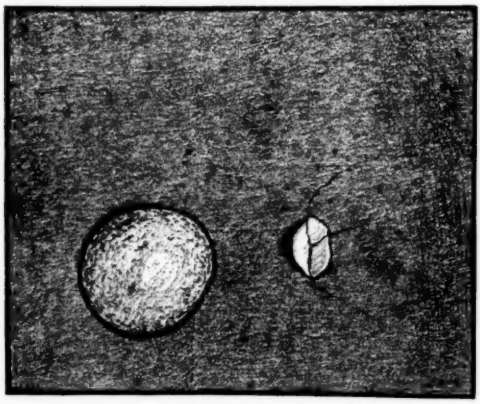

FIG 1.—RIGHT EYE (ERECT IMAGE).

About one papilla-breadth from the disc, to its temporal side, there is in each eye a nearly *circular area, several disc-diameters wide.* The area is bounded by a sharp-cut dark border, so as greatly to resemble in appearance a bubble as seen under the microscope. Within this area the choroidal red is still present, but rather paler than in the surrounding fundus, and there is also a little scattered brownish pigment. There does not seem to be any special difference in level between the floor of the area and the surrounding fundus, although precise estimates cannot be made on account of the constant nystagmus and also because of the absence of any distinctive markings upon which the ophthalmoscope could be accurately focused.

The surrounding fundus, apart from the total absence of vessels, appears perfectly normal.

The refraction, estimated by skiascopy under atropine, was about 0.5 D of myopia.

Here there was evidently *aplasia of the retinal vessels and probably also of the papilla*, which besides being bloodless was misshapen, pale, inconspicuous, and destitute of the usual markings. The appearances of the disc, indeed, were much like those obtaining in a marked post-neuritic atrophy. There were, however, absolutely no other evidences of in-

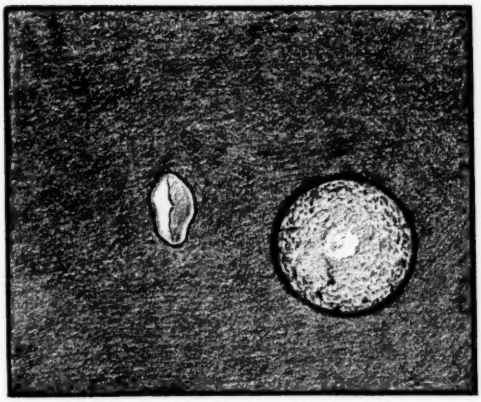

FIG 2.—LEFT EYE (ERECT IMAGE).

flammation. Moreover, according to the authors to be cited later, these congenital anomalies of the retina and nerve are rarely, if ever, due to inflammation, even when the gross appearances are those of an inflammatory process. The changes in the disc in the present case, therefore, seem more likely to be attributable to arrest of development rather than to an antecedent neuritis.

Furthermore, there was at the macula in each eye a large circular area, which gave the appearance of there being *either a defect in the retina* or else an abrupt, *cyst-like, perfectly transparent protrusion of the retina* at this spot. Which was the condition actually present could not be

stated with certainty, owing to the entire absence of retinal vessels or other markings that would have shown the structure and contour of the membranes. There was certainly no protrusion of the choroid, and it is not easy to understand how, without a simultaneous protrusion of the choroid, a cystic protrusion of the retina could have existed for two or three years and maintained its transparency. Yet the sharp black edge of the area, resembling greatly the dark rim of a bubble seen under a microscope, or of the edge of a dislocated lens when seen by transmitted light, strongly suggested the presence of a smooth, transparent, bladder-like prominence.

The case seems to be almost unique in that both the peculiarities described were present in eyes otherwise well formed and in a child of fairly normal development.

Aplasia of the optic nerve is not infrequent in *anencephalia*. In this condition various investigators[1] have found the ganglion-cells wanting in the retina and the nerve-fibres absent in both retina and optic nerve, the latter containing only glia or connective tissue.

Rosenbaum[2] has found a similar condition in *congenital hydrocephalus*.

Van Duyse[3] in a *cyclopean eye* found the optic nerve and papilla replaced by a mass of connective tissue, enclosing numerous vessels and ciliary nerves. There were also, at spots corresponding to what would have been the maculæ in the two component eyes, areas in which the choroid and pigment epithelium were absent, and the retina reduced to the supporting structures only ("coloboma of the macula"). There was furthermore a median inferior coloboma of the choroid; also two lenses; and finally two pupils, each in connection with a coloboma of the iris and ciliary body.

There may be more or less aplasia of the nerve and of the central vessels in *microphthalmus*. Dötsch[4] cites a remark-

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[1] Wahl, Manz, Pétren, and others cited by Rosenbaum (*Ztschr. f. Augenh.*, vii., 2, 1902), who records two additional cases.

[2] *L. c.*

[3] *Arch. d'ophtalmol.*, 1899, pp. 25 etc.

[4] *Arch. f. Ophth.*, 1899 (1), p. 59.

able case, observed in a two-days-old child. The right eye measured 7.5 x 8.0*mm.* In this the nerve was replaced by a thin connective-tissue strand, which contained no nerve-fibres. The retina also was devoid of nerve-fibres, but did contain ganglion-cells, although these were fewer than normal. There were no retinal vessels and no trace of a papilla. The retina showed in places various abnormities of structure; the choroid, ciliary body, and iris were undeveloped; there was a coloboma of the iris and ciliary body; and the cornea was opaque. In the left eye, which measured 8 x 10*mm*, the cornea was opaque and there were other changes, but the papilla, nerve, and retinal vessels were present, and the retina was fairly normal.

The total absence of retinal vessels in the right eye in the case last cited is noteworthy. For, as Dötsch points out, while the central artery is frequently absent in microphthalmus,[1] there is generally a substitute for it, formed by one or more vessels which perforate the sclera or the edge of the lamina cribrosa.

It is to be noted that in none of these cases of congenital anomaly were the changes such as could be attributed to inflammation. Hess[2] in discussing microphthalmus shows that what with the ophthalmoscope, and even at first glance with the microscope, may look like inflammatory products (*e. g.*, pigment deposits, etc.) are not really inflammatory in nature.

In the cases just cited there was in all some obvious and considerable vice of development (anencephalus, cyclocephalus, microphthalmus, congenital hydrocephalus), combined generally with marked abnormities in other parts of the eye beside the nerve and retina. Apart from such abnormities, aplasia of the retinal vessels and of the nerve seems very rare indeed. Interesting anomalies in the formation and appearance of the nerve and papilla, occurring in eyes of otherwise normal aspect, have been described by Purtscher,[3]

[1] Becker, *Arch. f. Ophth.*, xxxiv., 3; Hess, *ib.*, xxxiv., 3; Bach, *ib.*, xlv., 1.
[2] *L. c.*
[3] *Arch. f. Augenheilk.*, xii. (1883), p. 421.

Eversbusch,[1] Magnus,[2] Derjavine,[3] and others, but these cases have not even a remote resemblance to the one under consideration. I have not yet been able to find a record of an ophthalmoscopic examination of an eye, exteriorly normal, in which the retinal vessels were, as in my case, almost totally absent.

The *second condition* present in this case also seems very rare. It is obviously quite different from the so-called coloboma of the macula, in which the pigment epithelium and choroid are absent, so that the sclera is exposed. The only case that I can find which at all resembles it is one described by Birnbacher.[4]

A man, twenty-one years old, had V = $\frac{6}{6}$ in each eye with − 7.00D. Field normal; no central scotoma. Light-sense normal. Papilla and retinal vessels normal.

In each eye the macula was occupied by a circular structure 1.5 or more papilla-diameters wide. A deep black pigment ring surrounded the figure and sent jagged processes into it. Choroidal vessels crossed it; retinal vessels ran close to it, but did not cross it. The structure, although disc-like in appearance, was evidently conoidal, and, in fact, many *mm* high, for, while its apex (including the choroidal vessels which crossed over it) showed by the ophthalmoscope a refraction of − 8D in one eye and − 7D in the other, the papilla and remaining fundus—even right up to the edges of the prominence—had a refraction of − 25D.

Here there was evidently a finger-like protrusion consisting of both choroid and retina, and possibly also of the sclera as well, although Birnbacher thinks this unlikely on account of the very sudden change in elevation at the margin of the prominence. In any event, the case differed from mine, since in the latter there was no elevation of the choroid and possibly none of the retina, though the appearances strongly suggested a protrusion of the latter.

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[1] *Klin. Monatsbl. f. Augenheilk.*, 1885, p. 1.
[2] *Ibidem*, 1885, p. 43.
[3] *Wiestnik Ophtalmolog.*, Jan.–Feb., 1896, cited in *Arch. d'ophtalmol.*, 1896.
[4] *Arch. f. Augenheilk.*, xv. (1885), p. 159.

RETINAL ROSETTE FORMATIONS OF NEUROGLIA IN INFLAMMATORY PROCESSES.

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(*With two text-figures.*)

SINCE the publication of Wintersteiner's[1] book, *Das Neuroepithelioma Retinae*, considerable attention has been paid to the rosette figures on which, principally, was based the suggestion of the name neuroepithelioma for the malignant retinal tumor usually designated as glioma. Many articles have appeared on the subject of rosettes in retinal tumors, and lately the similar formations found in microphthalmic eyes have been frequently described. A few months ago Murakami,[2] working in Professor Schnabel's laboratory with Wintersteiner, found rosette formations as a result of a pure inflammatory process—a finding which, as he says, has not been described before. Recently I found most beautiful rosettes in an eye enucleated because of an acute inflammatory process. This finding and the general interest of the subject lead me to present this article.

For the tissue, on which this study is principally based, I am indebted to Dr. T. A. Woodruff. He is unable to give any clinical history of the case, as it was one that he saw a long time ago at a dispensary. He only remembers that the patient was a man of thirty-five or forty years of age. The label on the bottle has the clinical diagnosis, kerato-irido-cyclitis.

The enucleated globe, when it was given to me, to all outward appearance was normal except for a grayish haziness in the centre

of the cornea. It was in a 10-per cent. watery solution of formalin. The globe measured 25 *mm* in the antero-posterior diameter and 24 *mm* in the cross and vertical diameters. From the formalin solution it was transferred to alcohol of ascending strengths, and finally divided in the antero-posterior diameter. One-half was embedded in celloidin and sectioned. Sections were stained by hæmatoxylin and eosin. An attempt to stain by Mallory's neuroglia method was a failure, except that it stained all fibrous tissue very distinctly.

Macroscopic examination of the unsectioned half shows the anterior chamber to be shallow, the lens being dislocated forward. The vitreous is full of bands, which run fore and aft, and which are attached anteriorly in the region of the ciliary body and posteriorly to the retina. The retina is in place, except at the posterior pole of the eye, and apparently the detachment is caused by the pulling of the bands in the vitreous. There is blood in the vitreous, particularly posteriorly. Back of the detached retina—between it and the choroid—there is a grayish exudate, which does not show any fibrous bands or blood.

Histologically the cornea is disintegrating, and intensely infiltrated with leucocytes. At its centre the ulcer has perforated and Descemet's membrane is curled up in the exudate in the anterior chamber. The superficial blood-vessels at the limbus are engorged. The anterior chamber is filled with a mass of darkly stained material (with the eosin-hæmatoxylin), which contains innumerable leucocytes, particularly of the polymorpho-nuclear variety. The iris is adherent to the cornea at the angle of the anterior chamber, and at the pupillary border the pigment layer of the iris is ectopic—alternations which cause one to suspect that the eye was glaucomatous. The iris is made up of dense connective tissue, the result of former iritis; the muscle fibres have disappeared; the vessel walls are very much thickened. It is adherent in places to the lens capsule. It also is infiltrated with leucocytes, and the vessels are engorged. The ciliary body and processes are a mass of dense, congested connective tissue; from the body the muscle fibres have completely disappeared. The processes in places are lined normally by cells, in others the cell lining is absent. The remaining cells are swollen and broken up. The region of the zonula is very interesting in the development of blood-vessels and new connective tissue, which has taken place here. The vessels of this new tissue can be traced to their

origin in the ciliary processes. The region is very œdematous and contains many erythro- and leucocytes. The zonula fibres are greatly pulled apart and backwards by the shrinkage. The lens is cataractous. At the anterior pole the cells have multiplied and become fibrillar. At the cortex the fibres show degenerative changes. The nucleus is normal.

The retina anteriorly shows the changes which are ordinarily described as cystic. In this region the internal limiting mem-

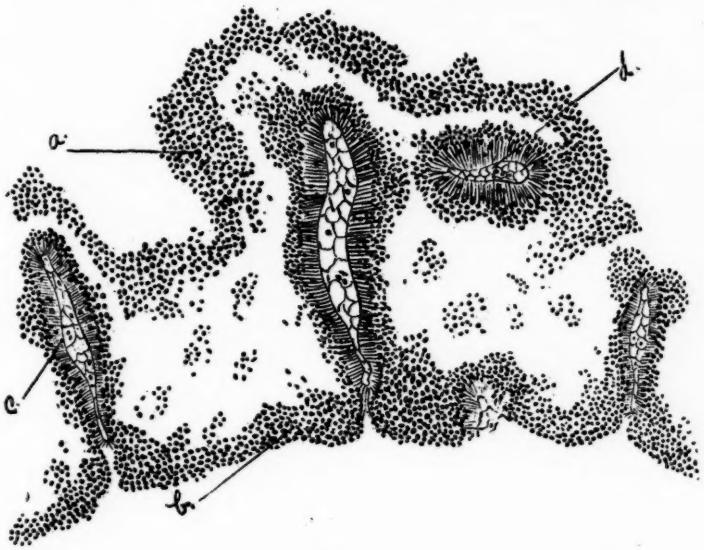

FIG. 1.

SHOWING FOLDS IN THE RETINA. *a*, INTERNAL NUCLEAR LAYER; *b*, EXTERNAL NUCLEAR LAYER; *c*, EXTERNAL LIMITING MEMBRANE; *d*, ROSETTE FORMED BY A FOLD.

brane is well defined, and the fibres, which are preserved and cause the cystic appearance, terminate in this membrane at their inner end; at their outer end these fibres appear to terminate in nucleated cells, which are intimately in contact with the pigment-cell layer of the retina. These long fibres look like the neuroglia fibres of Müller. Towards the equator of the globe the retina is greatly changed. Resemblance to the normal structure is maintained only by Müller's fibres (which appear to be even increased

in number, but which probably, as is the case in pathological processes, only stand out more prominently by reason of the disappearance of less stable structures), and by the persistence of the external nuclear layer and the external limiting membrane. The rods, cones, and ganglion cells have disappeared. Along the inner surface blood cells are found in masses which indicate extensive hemorrhage, and there is hemorrhage within the retina. In this region, in places, it remains attached to the choroid; at other places it is loosened.

A little back of the equator the retina is completely detached,

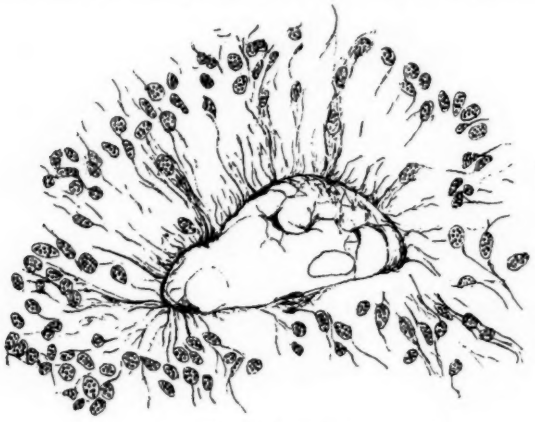

FIG. 2; × 1000.
A ROSETTE STAINED WITH MALLORY'S NEUROGLIA STAIN.

except at the papilla. It shows the change spoken of in the foregoing paragraph—the neuroglia tissues are preserved, the nerve fibres and cells have disappeared. Here, in a region included in a circle of about one-fourth of an inch, with the nerve as a centre, the retina shows a most striking picture—namely, beautiful rosette formations (see Figs. 1 and 2), and the very interesting fact is that these formations are clearly the result of infoldings of the retina. This part of the tissue is œdematous, and there is an accumulation of blood cells. Near the optic nerve there appears to be a development of new neuroglia tissue. This new tissue is particularly noticeable at the papilla where it fills up the depression formed by the backward bending of the fibres of the lamina cribrosa. This depression is a further indication that the eye was

glaucomatous, and lends weight to the view that probably the corneal ulcer and the resultant acute process was a sequel to the glaucoma.

The optic nerve is atrophic. The choroid is shrunken and atrophic. The vitreous chamber is filled with blood serum containing more or less blood cells, and fibrous bands are running fore and aft through it.

Summing up the foregoing findings, it may be said that we have a globe in which an acute general inflammation has followed an old irritative process; resulting, no doubt, from the old process, the less stable structures—*e. g.*, the rods and cones—have disappeared, while the fibrous structures—*e. g.*, Müller's fibres—have persisted, and even appear to be increased. In the midst of these changes occur the interesting rosettes.

As to the origin of the rosettes and similar figures, there can be no question. To repeat, they are clearly due to folds in the retina, which were probably caused by shrinkage of the bands in the vitreous.

If such rosettes may be formed in this way by folds of the retina, an interesting question is, Why have they not been described before?

Before undertaking to answer this question, there are two facts that must be considered: In the first place, the rosette formations of retinal tumors, particularly such as are shown in the specimen of Emanuel,[6] have not been studied frequently; secondly, when the retina forms such folds, the resemblance to rosette formations may be very indistinct. It will be remembered that, in the specimen described above, the condition of the retina—the disappearance of the nervous tissues proper and the persistence of neuroglia tissue—makes it possible for this specimen to show the rosette formations unusually perfect. Considering these facts, the idea suggests itself that similar folds and formations have been seen frequently, but their resemblance to the rosette formations of tumors has not been appreciated, and herein I believe lies the answer to our question.

Bearing in mind the idea that such formations not infrequently exist, I have looked over my histological sections.

The result was as anticipated; for in several specimens very distinct rosettes were found, and I venture the opinion that rosette formations in pure inflammatory processes hereafter will be observed frequently.

For further support of my view of this question, I have looked through recent literature for pictures of similar formations and the interpretation of them. We do not have to go farther back than the *New York Eye and Ear Infirmary Reports* for 1900, in which Fridenberg[3] describes such formations, with illustrations, in a study of a degenerated globe. He speaks of them as cysts, and does not intimate that they have any resemblance to the rosettes of tumors.

Such findings as we have in this specimen, I venture to believe, have an important bearing on the discussion of the subject of the make-up of rosettes, for here we have rosettes the lining wall of which, without doubt, is the external limiting membrane. And the question at once arises as to the identity of rosettes of inflammatory origin and those found in retinal tumors.

The first intimation that the rosettes of tumors and those sometimes found in microphthalmic eyes are similar comes from Wintersteiner,[4] who, in the study of a microphthalmic eye and its rudimentary retina, found rosette formations, which he says are perfectly analogous to those found in retinal tumors. A recent confirmation of this finding is by Dötsch.[5] In a study of a microphthalmic eye, he found rosettes which had a great similarity to those described by Wintersteiner in tumors, the one essential difference being that the rosettes that he found were larger than those described by Wintersteiner; but he says: "Trotzdem glaube ich, dass wir es mit Gebilden ganz analoger Natur zu thun haben." Murakami,[13] in his study of the rosettes due to inflammatory changes, says: "Die Rosettenbildungen der Neuroëpithelialschicht in unserem Falle sind der Form noch analog der jenigen, welche von vielen Autoren bei Microphthalmus und Glioma retinae, ferner bei Conus nach innen-unten, beschrieben sind." It was my good fortune to be at work in Prof. Leber's laboratory when Dr. M. Wiener was studying the tissue afterwards described by Dr. Carl

Emanuel,[6] and I am the possessor of a couple of sections of this tumor, of which it is said: "Die Rosetten finden sich bei uns in grossen Mengen." It is interesting to compare this tumor tissue with that of my sections. The striking feature is the great similarity of the rosettes. From this comparison, we can only confirm the findings of Murakami, and say that these rosettes — the result of folding of the retina — are analogous to the rosettes that have been found in tumors and in cases of microphthalmus.

The fact that the wall of the lumen of the rosettes of my specimen is the external limiting membrane confirms the views of Wintersteiner[7] ("Die Glänzende, dem Lumen der Rosette, respective der Concavität des Bogens, zugewandte Linie entspricht der Membrana limitans externa"), and this brings us to the conclusion that I believe this specimen particularly points out, *i.e.*, that the rosettes of tumors are made up of cells which may form neuroglia — external limiting membrane. The bearing of this fact on the discussion started by the introduction of the term neuroepithelioma is immediately evident. If these cells form neuroglia, the tumor made up of them is, according to our present nomenclature, a glioma.

There is little question of the character of the external limiting membrane. All the text-books speak of it as neuroglia tissue, and confirming this is its reaction with Wiegert's special stain, as has recently been demonstrated by Pines.[8] I have confirmed this finding in tissue which I succeeded in staining with Mallory's neuroglia stain.

This demonstration of the nature of the rosettes in the specimen described in this article, bears out the conclusion that I[10, 11] arrived at in a recent study of a retinal tumor. In the sections of this tumor, I succeeded in staining rosettes by Mallory's neuroglia stain, and on that reaction I based the conclusion that such retinal tumors originate in neuroglia. Two statements in the article referred to I must change. In the rosettes of the tumor I thought the lumen corresponded to the internal limiting membrane and the radiating fibres to the neuroglia fibres terminating in the internal limiting membrane. In the light of the folded

retina, I would rather say that the wall of the lumen of the rosettes corresponds to the external limiting membrane (as Flexner[9] and Wintersteiner said), and the fibres terminating in it to the neuroglia fibres normally terminating in the external limiting membrane. There is also good ground, however, for the view that rosettes may be formed in which the wall of the lumen would correspond to the internal limiting membrane.

It may be permissible to mention briefly that the conclusion that the rosettes are neurogliar in character is much more in harmony with the general teachings of pathological anatomy and is more nearly what we would expect, from the findings of similar rosette formations in gliomas arising in the brain, than the suggestion that these formations are made up of cells which form rudimentary rods and cones.

Retinal tumors with rosette formations may be classed as histioid tumors — tumors in which one or another tissue is more or less faithfully reproduced. It is a recognized fact that histioid tumors are essentially benign. These facts, with the further fact that gliomas of the brain in which rosette formations are found are not malignant tumors in the sense that carcinoma and sarcoma are,—*e. g.*, they do not form metastases to other organs or cause cachexia like sarcomas or carcinomas,—are food for interesting speculation. The question immediately presents itself, Are the retinal tumors with rosette formations less malignant than those without such formations? Or, putting it another way, Is the retinal tumor with rosette formations an exception to the general teaching that retinal tumors are highly malignant? Unfortunately, with the material at hand, this question cannot be answered. However, the case of Emanuel,[13] which was most thoroughly studied, is suggestive. The eye was blind and inflamed when the child was three years old; at five and one-half years of age the patient was taken to the Heidelberg Clinic and the eye was enucleated; four years later it was noticed that the child had been perfectly well since the enucleation. This history shows that in this case, in which rosettes were a most prominent finding, the tumor was not of a highly malignant type; and

the comment may be made that many a retinal tumor has had such a chronic course, the patient recovering perfectly after its removal, while the histological description does not mention rosettes. But the comment could also be made that, maybe, in these cases of chronic course and recovery after removal, the histological type of the tumor was similar to that of the case described by Emanuel, for we well enough know that it is only since the exhaustive work of Wintersteiner (1897) that the rosettes of gliomas of the eye have been properly recognized. But, as before stated, this question can only be a matter of speculative interest now. Even in the relatively few recorded cases of retinal gliomas with rosettes, the subsequent clinical history is very incomplete. Of course, these considerations are only of pathological and prognostic interest—the treatment of these tumors is not affected.

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13. MURAKAMI. *Loc. cit.*, p. 451.

CYTOTOXINS AND SYMPATHETIC OPHTHALMIA.

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IN the light of results that are being published almost every week, it seems safe to venture the opinion that the discovery of what is known as "Pfeiffer's reaction" will be one of the landmarks in the history of medicine, and the beginning of investigations that may have the most far-reaching results in our science.

By way of review, it may be pointed out that Pfeiffer immunized a guinea-pig against the vibrio of cholera by repeated injections—made at intervals of a few days—of cultures of this organism. Into the peritoneal cavity of such a prepared guinea-pig Pfeiffer injected living cholera vibrios. From time to time, at intervals of a few minutes, he withdrew from the peritoneal cavity small amounts of the peritoneal fluid containing the organisms. By examination with the microscope the withdrawn bacteria were found to have undergone changes. Pfeiffer found that living motile bacteria when put into the peritoneal cavity of an immunized guinea-pig almost immediately lost their motility, in a few minutes they became swollen and underwent a granular degeneration, and very quickly were entirely destroyed ("Pfeiffer's reaction" or "phenomenon").

The bearing of this phenomenon on the suggestion that I have to make begins with the work of Bordet.[1] His work

consisted in the study of the known fact that if rabbits' blood corpuscles be injected into a horse, the serum of such a horse develops poisonous properties towards rabbits. And the question naturally arose as to what happens if other kinds of cells are injected into the bodies of animals of different species than those from which the cells are derived. Emulsions of the testicle were injected into the peritoneal cavity of such an animal as the guinea-pig. After some days the blood serum of the prepared guinea-pig develops the capacity of immobilizing fresh spermatozoa of the kind used in the injection. And experiments were made with white blood corpuscles, with emulsions of spleen, bone marrow, etc., and now we have all sorts of cytotoxins gotten by such injection experiments. It will be observed that the toxins obtained in this way are heterotoxins—*i. e.*, produced in animals of different species.

Then came experiments in the production of isotoxins—toxins produced in similar species. Nefedieff [3] ligated one ureter in various rabbits, and several weeks later injected serum from such animals into the ear vein of healthy rabbits. These experiments, of course, were based on the idea that ligature of the ureter may lead to the accumulation of toxic material in the organism. The injected animals developed albuminuria. In one rabbit with albuminuria, which was killed on the seventh day, the kidneys showed marked degenerative parenchymatous changes, with some intertubular round-cell infiltration. Other isotoxins have been found. For instance, Hulot and Ramond [3] have produced parenchymatous degenerations in the liver of guinea-pigs by the injection of suspensions of liver cells of guinea-pigs. Of particular interest to us is the work of Castaigne and Rathery,[4] who, in rabbits subjected to ligature of the renal artery, the ureter, and the entire pedicle of the kidney, found more or less well-marked degenerative changes in the opposite kidney; while in the case of unilateral nephrectomy, these authors found no histological changes in the opposite kidney. To repeat (accepting the experiments quoted above): (*a*) blood serum from a rabbit with one ureter ligated, injected into the blood of other rabbits, causes in the kidneys degenerative

parenchymatous changes; (*b*) ligature of the ureter, the renal artery, and the entire pedicle of the kidney causes more or less well-marked degenerative changes in the opposite kidney; (*c*) unilateral nephrectomy causes no histological changes in the opposite kidney. The logical conclusions from these experiments are that the toxins are in the blood, and that these toxins owe their origin to degenerations which have taken place in an injured kidney.

If these conclusions may be accepted, it does not take a far fly of the mind to suggest an hypothesis for the causation of that unexplained, miserable condition that sometimes confronts us—so-called sympathetic ophthalmia. And I venture to suggest that it may be given to some fortunate experimenter to demonstrate that when a damaged eye degenerates in the orbit, the cells of the eye (probably the lining cells of the ciliary processes and the iris) can give rise to a specific cytotoxin, which, circulating in the blood, picks out the cells of the fellow eye, and may cause changes which we now designate as sympathetic ophthalmia.

The above considerations prompted me to the following experiment, with the hope that I might get a heterogeneous toxic serum for eyes. On January 3d, three dogs were killed, and immediately the eyes were enucleated. The enucleations were done under as cleanly conditions as possible, and as they were taken out they were washed in boiled water and put into Petrie dishes. Each eye was divided into halves at the equator. From the anterior half the vitreous and lens were removed (the posterior capsule of the lens was divided by a cross-section, and the lens was removed by expression). After the six anterior halves of the eyes were thus gotten, they were put in a sterile mortar, containing a small amount of normal salt solution and a small amount of sterile sand. The whole mass was pounded, and thus an emulsion was made of the cells of the ciliary processes, ciliary body, and iris. This mixture was allowed to stand for about an hour, and the clear fluid taken up into sterilized glass pipettes for the purpose of allowing further settling, and the resulting clear fluid was injected by means of a sterile syringe into the peritoneal cavity of a healthy

goat. Seven days later, on January 10th, this process was repeated, using four eyes. On January 17th, a mixture from six eyes was injected into the goat, and on January 24th, six more eyes were injected. On February 5th, blood was taken from one of the large veins of the neck of the prepared goat. This blood was allowed to coagulate, and, on the following day, the serum (3*cc* per kilo of dog weight) was injected into a vein of a normal, healthy dog. At the same time, a normal goat was bled, and a similar amount of serum was injected into a control dog. On February 8th, emulsion from six more eyes was injected into the goat. On February 11th, both dogs that had been injected with goat serum were killed, and the eyes enucleated and put into formalin for twenty-four hours, and later into alcohol. On February 21st, two weeks after the last injection, more serum was collected from the goat and injected into a dog (3*cc* per kilo). The eyes of the dog were watched carefully for clinical symptoms, but none appeared. It may be said that two days after the injection there was a little redness of the eyes, which aroused some interest. It, however, promptly disappeared, and, in all probability, was due to some accidental irritation. Four days after the injection of the dog with the serum, the dog was killed, and the eyes put into formalin for twenty-four hours, and later into alcohol of ascending strengths.

After proper preparation, these eyes were imbedded in celloidin, sectioned and examined. There were no histological findings in the eyes of the dogs that got the toxic serum that differed from those of the other dog.

Unfortunately, these experiments lend no weight to the theory suggested, but it also may be said that they do not disprove it. Further experiments must be made. The lines along which experiments should be made will suggest themselves. Possibly I did not, in the selection of a goat and dogs, pick the proper animals for the production of a heterogeneous cytotoxin for eyes; maybe I did not introduce enough material, and maybe I did not continue the injections into the goat long enough. An interesting experiment suggests itself to me, and I am waiting for an

opportunity to try it, viz., the injection of blood serum from a patient suffering from sympathetic ophthalmia into the blood of a monkey.

It is a great temptation to point out the harmony of this theory with the clinical findings in sympathetic ophthalmia, and when the theory is viewed in the light of these findings some very interesting facts and ideas present themselves, but it does not seem proper to go further into the subject here.

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ON CONGENITAL CYSTS OF THE EYEBALL AND THEIR DEVELOPMENT.

By Prof. C. HESS, Würzburg, Germany.

(*With ten figures on Plates I.–II., Arch. f. A., XLI.*)

Abridged translation from *Archiv f. Augenheilkunde*, xli., 1, March, 1900, by Dr. Ward A. Holden.

THE lively interest in the subject of the development of congenital deformities which has been shown in many articles published in the last few years leads me to report briefly on some cases, in part examined long ago, which seem to me to be of value from various points of view.

Case 1.—The pig's eye to be described (Figs. 1–3) was sent to me by Dr. W. Asher of Leipsic. It was of nearly normal size (corneal diameter 12*mm*, sagittal axis 20*mm*), the anterior chamber of medium depth, the pupil round and large. In the fundus were to be seen several grayish-white stripes resembling detachment of the retina. In the lower portions of the fundus was a large pure white reflex.

A cyst lay beneath the eyeball, in volume about double the size of the eye. Its greatest breadth was 35*mm*, its sagittal diameter 20–25*mm*, and it was divided by an antero-posterior constriction into a larger right portion and a smaller left. The cyst wall was everywhere very thin and translucent, and filled with a clear liquid which communicated directly with the interior of the ball. Slight pressure upon the wall of the cyst increased the intraocular tension considerably and conversely pressure upon the ball rendered the wall of the cyst more tense. When the eye was held toward the light, by looking through the cyst the communication could be seen as a large round dark spot. The optic nerve was of normal size and entered the ball near the place of communica-

tion between ball and cyst. The wall of the eyeball, consisting of a dense fibrous pigmented sclera, here bulged backward and downward, and passed between the two halves of the cyst. After hardening in 10 % formol, the cyst was divided by a horizontal section corresponding to the line *a a* in Fig. 1. The upper half of the cyst with the adjacent portion of the eyeball seen from below presented the picture seen in Fig. 2. Between the interior of the eye and the cyst there was communication by means of two round openings separated by a connective-tissue septum which followed nearly the entire extent of the cysts, corresponding to the constriction observed externally. The two openings had fairly sharp margins and like a portion of the adjacent cyst wall were covered with dark pigment which passed over without interruption into the retinal pigment. The greater part of the cyst wall, however, appeared to have little pigment or to lack it altogether. The cyst wall passed directly into the sclera of the adjacent portion of the ball.

The retina in the interior of the eye was partly detached and lay slightly folded in the vitreous chamber. At the points of communication some folds of retina passed into the cyst cavity for 1–1½*mm*. Even macroscopically the retina could be seen to be defective at these points.

The ball was then divided at the equator by a frontal section corresponding to the line *b b* (Fig. 2) into an anterior and a posterior half. The section (Fig. 3) passed through both openings between the ball and cyst. The septum described above as separating the two openings here appeared as an irregularly triangular formation 1–2*mm* in diameter. In the opening to either side of it were numerous folds of retina. In the anterior half of the ball the normally formed lens was found in its normal location. The ectatic part of the wall of the eyeball scarcely reached the ora serrata anteriorly, so that the ciliary body and neighboring parts appeared normal. The optic-nerve head seen in the posterior half of the ball appeared normal.

The microscopic condition, in so far as it was of interest in explaining the development of the malformation, was as follows: The retinal pigment epithelium could be followed through the openings, and continued as the lining of the cyst wall. The latter showed much the same changes that I described in a similar case in a human eye.[1] From the epithelium of a single stratum

[1] *Arch. f. Ophth.*, xlii., 3, p. 214.

developed gradually a many-layered epithelium of elongated cells, which in varying thickness lined the cyst lying directly upon the scleral wall, no choroid being visible. On the whole, the changes in the pigment epithelium were less here than in the case described previously. The septum everywhere had the character of scleral tissue and was covered with the same altered epithelial layer. The posterior end of the septum passed directly into the sclera just below the optic-nerve head. The retina, in general, exhibited no particular changes. It could be followed through the openings a short distance into the cyst. The ampulla-formed bulging just beneath the optic nerve proved to be a so-called coloboma of the optic nerve, which will be described in detail with other cases at another time. The retina in this bulging part was stretched and contained an excess of connective-tissue elements. I could not satisfactorily determine whether there had been a closure of the secondary optic vesicle in its entire extent, or whether, as in the two cases following, it had not closed in its entire extent. Some sections of the series made it seem probable that here also there had been a lack of closure for some distance at least.

Case 2.—The pig's eye with a malformation now to be described was sent to me by Dr. Rosenthal of Ascherleben. The eye, some hours after the animal's death, was put into bichloride solution 1:2000, then in a 1:200 solution, and then into alcohol. The cornea had about the form of an equilateral triangle, and its diameter in the middle was about 7–9*mm*. The axis of the ball was about 20*mm* long. In Fig. 4, *a* and *b*, is seen the peculiar form of the eye. At the equator were two flat lateral ectasias, and there was a third similar one above. Directly downward was a cyst divided by a constriction into two unequal parts, 8*mm* high and 15*mm* broad, similar to that found in Case 1. The optic nerve entered the ball just above the cyst. The sclera of the entire eye was thinner than that of the normal pig's eye and in the region of the cyst it was thin and transparent. After dividing the hardened eye by an equatorial section, the anterior segment seen from behind presented the picture shown in Fig. 5. The cyst communicated with the ball through an opening about 7*mm* wide. Through the middle of this opening ran from behind forward a small round filament 1*mm* in diameter, with a small dark spot in the middle. About the middle of the cyst wall ran a slight elevation corresponding to the externally visible line

dividing the cyst in half. The retina ran continuously over the opening of communication in these sections. Whether there was a break in the retina in the posterior half of the ball could not be definitely made out on account of the imperfect preservation of the specimen.

The microscopic examination showed a continuous extension of the retinal pigment epithelium over the inner surface of the cyst wall. The changes in the epithelium were less marked than in the first case, in that over considerable areas a slightly pigmented epithelial covering lay directly upon the sclera. In the wall of the cyst here no trace of choroid was to be seen. The narrow filament extending through the opening of communication had a typical scleral character. The black point in the middle was due to pigment, such as is found in the normal sclera of the pig. From the end of the scleral filament fibres ran slightly divergent to the capsule of the lens.

The significance of this peculiar condition will be made plainer when we consider the changes to be described in the third case. We must suppose that the fibres represent the remains of the connective tissue which passed through the fœtal ocular cleft and at the corresponding point prevented the closure of the cleft for a short distance. This will be alluded to later.

These two cases of malformation are characterized in general as follows: The development of a large cyst downward from the ball with a corresponding thinning of the sclera in eyes of fairly normal size; the division of the cyst by a well-developed septum lying near the median line; a large opening of communication between cyst and interior of the ball, in both cases divided into lateral halves by a median scleral tract corresponding to the septum; lining of the cyst wall with pigment epithelium which near the openings of communication passes over into the pigment epithelium of the retina; absence in the cavity of the cyst of the retinal tissues developing from the inner layer of the secondary ocular vesicle. In one case the retina was distinctly interrupted at two points. In the second case it was evident that the closure of the cleft in the secondary optic vesicle had not been completed anteriorly because of the presence of tough fibres connecting the scleral stalk with the inferior margin of the lens.

CASES 3 AND 4.—The two eyeballs to be described had no cysts but there were malformations which help to explain the conditions found in the preceding cases. They were sent to me by Dr. Krückmann of Leipsic, who obtained them from an infant that died in birth. They were removed immediately and fixed in formol, and hardened in alcohol.

The left eye exhibited the following conditions: The ball was of normal size and color, the cornea clear, the anterior chamber of medium depth. In the iris was a broad coloboma downward, ending in a point at the root of the iris. The eye was opened by a horizontal section above the plane of the optic-nerve entrance. The appearance of the lower half is shown in Fig. 6.

Macroscopically the optic-nerve entrance appeared normal. About 1*mm* beneath it was the posterior margin of a nearly circular coloboma, almost white and free from pigment, 13*mm* in diameter. This extended anteriorly almost to the ciliary body, which presented peculiar conditions. The ciliary processes were not joined inferiorly to make a complete ring, but it seemed as if their junction had been prevented by a fine septum and that they had developed along this posteriorly to an abnormal extent. The lens was in position and of normal shape. The condition of the vitreous was interesting. Examined macroscopically, the upper two-thirds were of normal appearance, but a portion 6*mm* high and 13*mm* broad just above the coloboma was almost completely wanting. In place of it was a number of fine fibrils or incomplete septa which passed out radially from the middle of the coloboma. The retina everywhere lay in apposition to the choroid.

The condition of the right eye was as follows: It was smaller than the normal, being 15.5*mm* long, equally broad, and 13.5*mm* high. In the iris was a broad coloboma downward, narrowing toward the root of the iris. In the lower half of the ball was a broad coloboma of the choroid, which anteriorly presented the same strange conditions found in the other eye. But posteriorly it differed from the other eye in that the coloboma extended beyond the disc. The greater part of the coloboma was not ectatic, so that the ball generally preserved a normal shape. Only close to the lower margin of the nerve head, corresponding to the passage of the optic-nerve sheath into the sclera, was an ampulla-like ectasia downward and backward, 3–4*mm* in each diameter. The lens was normal in shape and location.

I wish to describe briefly a third eye similar to these two, given to me by Professor Sattler. It was obtained at the autopsy on a man of thirty-five and its lower half is pictured in Fig. 7.

The unopened eye presented a small coloboma of the iris, and a well-marked ectasia and thinning of the sclera 15*mm* in diameter and of nearly spherical shape, including the nerve head and extending forward beyond the equator. The greatest height of the ectasia above the normal sclera was 7–8 *mm*. After opening the eye by a horizontal section the lower half presented the picture shown in Fig. 7. In the inferior periphery of the lens downward were two small depressions. The ciliary body exhibited the same changes as in the two cases just described. Corresponding to the external ectasia was a large coloboma of the choroid extending beyond the macula. The nerve head appeared oval, deeply excavated, and was divided into two equal parts by a fine vertical furrow. A rudimentary hyaloid artery extended a short distance into the vitreous.

All three eyeballs were stained in toto in alum-carmine and cut in serial sections.

The following points in the microscopic condition of these three eyes are worthy of notice.

A frontal section near the ciliary body in Case 3 is represented in Fig. 9. The cleft in the secondary optic vesicle had not closed on account of a short connective-tissue process which passed from the sclera 1–3*mm* into the vitreous and here broke up into a number of fine fibrils. Close to this process lay the points of folding of the inner layer of the secondary vesicle back into the outer layer. The two folds lay 1–3*mm* apart. The transition of one layer into the other followed here in a typical, regular way. The outer layer consisted of a regular single stratum of epithelium. It is evident that no morbid process interfered with the growth of the ocular proton preventing the junction of the margins of the cleft, the cause which has been assumed to exist in cases of similar malformation. The growth of the proton was sufficient to bring the two margins together, as is shown by the fact that near the point of reduplication considerable folds of the retina were present. A glance at Fig. 9 will show that there was sufficient

retina to effect a junction and that this had been prevented by the mechanical obstacle—the scleral process.

Quite a different condition is found farther back at a point corresponding to the greatest breadth of the coloboma (Fig. 10). To save room I have here represented only the parts bordering the coloboma laterally. The middle part, corresponding to the break in the drawing, shows the same histological features as are represented in the middle part of the drawing. Here the fœtal cleft had closed completely, but at this place and near it the retina was greatly thinned and for a considerable distance appeared only as a fine connective-tissue membrane. The outer layer of the secondary vesicle was pigmented nearly to the coloboma and then continued as a single stratum of non-pigmented cells. Choroidal tissue was completely wanting in almost the entire extent of the coloboma.

Fig. 8 shows the condition of the optic nerve with the short persistent hyaloid artery and the condition of the retina in the portion of the coloboma near the disc. The two other cases exhibit practically similar conditions so that I shall omit a special description of them. The histological relations of the coloboma of the nerve are of little interest in respect of the questions under consideration and will be discussed elsewhere.

The particular interest in the case last described lies in the fact that it shows in a clear and typical way the results of the mechanical interference with complete closure of the anterior portion of the fœtal cleft, while the posterior portion has closed, but the overlying retina is here a delicate thin membrane only. These changes, as well as those in the vitreous (in Case 3) are fundamentally different from those which we are accustomed to find after inflammatory changes in the eye. The continuation of the connective-tissue tract into the vitreous renders comprehensible the connection between the scleral stalk and the inferior margin of the lens in Case 2.

The development of these cystic formations (Cases 1 and 2) in the light of the cases previously published by me would seem to be most readily explained as follows: The

invagination and the closure of the secondary optic vesicle took place in a fairly normal manner. In the region of the closure a portion of the bulbar wall had so little resistance that after the closure it yielded to the intraocular tension and became greatly distended. The outer layer of the secondary vesicle followed this distension and lined the inner surface of the cyst wall, exhibiting various changes, such as I have described in cases previously reported.

The inner, readily ruptured, layer of the secondary vesicle showed in the first case an interruption of continuity at both the places corresponding to the greatest distension, so that the cavity of the cyst communicated directly with the vitreous cavity. In the second case a similar break doubtless existed, although this could not be shown definitely. The comb-like ridge, which in the first case was well developed and passed along the middle of the entire wall of the cyst, and in the second case was only indicated, corresponded to the region of the fœtal cleft. The marked development of such a ridge is well known by reason of many clinical observations and many pathological findings even in malformed eyes in man. No particular proof is required that the fine tract which in each case ran from the lower margin of the nerve head to the inferior margin of the lens was of the same genetic origin.

The question now arises whether this explanation is sufficient to account for the development of these malformations or whether there may not be other possible explanations. In the beginning we must find whether the conditions can be referred to an extension of the primary optic vesicle, an explanation which has been offered to account for the production of various congenital cysts. In general this explanation does not seem to me plausible, since in the great majority of the cases that have been carefully examined the cysts have lain downward from the eye and have been in the closest connection with the line of closure of the cleft in the secondary vesicle. In some cases cystic bulging of the walls is found at some other point, the sclera being thinner than normal. If the cysts arose from a protrusion of the primary vesicle before the secondary vesicle was

formed, it would be difficult to understand why the protrusion should occur nearly always at the site of the cleft in the secondary vesicle, for we know that all portions of the primary vesicle are equally resistent.

In regard to the old theory that a fœtal sclero-chorioretinitis is the cause of these malformations, I have been convinced by the examination of a number of microphthalmic eyes with coloboma that in many there are no indications of a recent or an old inflammation; I have stated that the supposition of slight individual differences in the development of the mesodermic tissues entering the vitreous chamber through the fœtal cleft is supported by many facts and by many analogies in general histology, and that it permits us to explain these malformations in a relatively simple way.

It is well known that in place of the vitreous there may be formed varieties of tissue which according to our histogenetic conceptions are doubtless of mesodermic nature and are not the result of inflammation. Thus, for example, cartilage and fat have been found frequently in place of the vitreous. The view previously expressed by me that in such cases there was an atypical development of mesodermic tissue in an early embryological period has been accepted recently by many investigators. Even if the presence of pure connective tissue in these cases were the result of chronic inflammation, no inflammation would account for the presence of fat or cartilage in the vitreous, and one is obliged to assume an atypical development of mesodermic tissue.

The appearance of slight individual variations in the development of two adjoining tissues is of every-day occurrence. If we call all changes which directly or indirectly lead to disturbance of function in an organ "morbid," so must the same process, which in one case produces only a harmless variation, in another be designated as distinctly morbid. It is evident that the old theory of so-called "simple check in development" does not satisfactorily explain such malformations as microphthalmus with coloboma. The idea that a fœtal inflammation was the chief cause,

generally held fifteen years ago, is now mostly given up. On the other hand, the view has again become prevalent in another form that inflammation plays a rôle in the development of malformations — in the supposition that there is a general disturbance influencing the growth of the whole eye and preventing the approach of the margins of the fœtal cleft. My remarks were confined to the group of cases in which careful microscopic examination revealed no evidences of present or past inflammation. In numerous cases there has been found no evidence whatsoever of a diffuse inflammatory process. The explanation of these malformations as being due to individual variations appears to me simpler and more plausible than to assign them to a hypothetical inflammation of unknown cause running a latent course.

An example of another group of malformations may be described briefly. I once examined a small chicken embryo of five days' development in an incubator, in which one eye so far was normally formed and the other was wanting, while the entire brain otherwise was normal. I stated that the supposition of an inflammation here was not only not proved, but was absolutely to be excluded, for one could not conceive of an inflammation severe enough to have produced this effect and yet leaving no trace at the fifth day of incubator existence in the very delicate embryonic tissues.

Although this malformation does not belong in the same category with the others, it yet proves that the most marked developmental anomalies may occur without any inflammation; the hypothesis of inflammation here fails completely. A similar disturbance would seem particularly to fit the cases of pure microphthalmus, *i.e.*, cases of eyeballs small in all dimensions without coloboma. But if in explanation of this malformation one assumes anomalies of the formative effort either in intensity or in quality, the assumption of a similar anomaly of formative effort cannot be excluded in respect to the mesodermic tissues entering the vitreous cavity. A slight increase in the intensity of this formative effort could lead to a disturbance of closure of the cleft in the secondary optic vesicle.

The malformations in question have a considerable tend-

ency to be transmitted by inheritance. The inheritance of an inflammation is not to be thought of, but physiology and pathology offer us numerous examples of the inheritance of individual variations, although their ultimate cause is unknown to us.

My views previously expressed in regard to the rôle of inflammation in the development of malformations have not been altogether correctly quoted, so I quote verbally from my first communication of about thirteen years ago: "Although I have no doubt that a number of the cases of microphthalmus which are supposed by the authors to be due to inflammation are really to be explained in the manner I have pointed out, yet I am far from questioning the effect of an intra-uterine inflammation and its results upon the development of the eye."

Explanation of the Figures.

Fig. 1.—Case 1. Ball seen from behind.

Fig. 2.—The same, after removal of the lower half of the cyst by a horizontal section corresponding to the line *a a*, Fig. 1, seen from below.

Fig. 3.—Posterior half of the same ball after it had been opened by a frontal section corresponding to the line *b b* in Fig. 2, seen from before.

Fig. 4.—Case 2. *A*, front view; *b*, side view.

Fig. 5.—Anterior half of the same ball, after division by a frontal equatorial section, seen from behind.

Fig. 6.—Case 3. The eye of a newborn child, lower half, seen from above.

Fig. 7.—The eye of a man of thirty-five, lower half, seen from above; beneath it the lower half of the lens with a coloboma.

Fig. 8.—Case 3. Sagittal section through the optic nerve (with remains of the hyaloid artery) and through the posterior end of the coloboma.

Fig. 9.—Case 3. Transverse section through the coloboma near the ciliary body.

Fig. 10.—The same case. Transverse section through the coloboma in the region of the equator. To save space the middle part of the coloboma is omitted since it shows changes similar to those in the lateral parts shown in the drawing.

ASTHENOPIA DEPENDENT ON NEURASTHENIA AND HYSTERIA.

By Dr. H. GRADLE, Chicago.

ALL works of reference describe in detail the symptoms which may be produced by errors of refraction. But neither text-books nor most of the special articles in American periodic literature specify the conditions which determine the variations in symptoms. As a rule, the inexperienced reader is led to infer that optic imperfections may cause any one of a large array of annoyances in otherwise normal subjects. The present study, based upon a long experience in many thousands of instances, is intended to classify asthenopic symptoms according to their etiologic conditions.[1]

Normal Asthenopia.—The minimum of annoyance which a healthy person complains of in consequence of an anomaly of refraction or an insufficiency of accommodation may be called normal asthenopia. If we select from a large experience those instances presenting the least degrees of annoyance, we will find that a variable amount of H., not rarely up to 1.5D, and exceptionally even to 3D, is tolerated without complaint until the accommodation proves insufficient for near work.[2] The time of life when such a degree of H. becomes perceptible depends upon the taxing of the eye for near work. It may be during school time; it may be much later in life. The same statement applies

[1] Although these observations have all been recorded in my case-books, I do not think that a statistic presentation will teach as much or as correctly as a study of those individual cases which I have been able to observe best.

[2] Similar statements have been made repeatedly by St. John Roosa. The same facts have also been noticed in various statistic examinations of school children and of military recruits.

to low degrees of astigmatism, either Ash. or Asm. But while 1.5D of As. may not interfere with the utility of the eyes until long after puberty, any As. greater than 0.5D necessarily reduces the visual acuity, though not always to an extent of practical importance. When the lower degrees of H. and As. produce subjective disturbances, the symptoms are practically identical with those of presbyopia in the class of patients now under consideration, viz., those presenting the minimum of annoyances. As in presbyopia, it becomes difficult to maintain distinct sight for fine objects near the eye, especially in poor light. If the work is continued in spite of blurring, a tired feeling of the eyes results, which subsides gradually upon resting. In other words, in a certain class of persons, low and even medium degrees of H. and As. cause no symptoms except those of presbyopia far ahead of the presbyopic time of life of normal subjects.

On studying these persons from a medical point of view, we will find them, as a rule, perfect types of healthy humanity. But their number is not large in ophthalmic practice. Most of them go to the spectacle dealer rather than to the oculist. Occasionally we meet even with high degrees of ametropia which present no more subjective symptoms than those described. But such persons will admit that they have had this amount of annoyance as far back as they can remember, and in cases of this description the sight is always below normal, and hence, as a rule, close eye-work has been avoided.

THE EXAGGERATED ASTHENOPIA OF NEURASTHENIA AND ANÆMIA.—The majority of ametropes in private practice present a much larger array of complaints than those described. In comparison with the normal minimum of annoyance their asthenopia may be called exaggerated in three ways. In the first place, symptoms may be caused by a low degree of error which is entirely latent in subjects of the previous class of the same age. Secondly, the annoyance is more than a feeling of fatigue. It may be a real pain in the eyes, described as aching, smarting, or drawing, or the pain may extend in the form of headache. Dull feeling throughout the head, sometimes dizziness, occasionally even nausea,

may be complained of. Thirdly, the symptoms may not cease promptly upon resting the eyes, but may continue after close eye-work for hours, or be brought on even by efforts of distinct vision in the distance. There is, however, always some correspondence between the intensity of the symptoms and the amount of eye-work. When the patient complains of headache or other distress during rest of the eyes, or when such annoyances prevent sleep, they do not arise from ametropia. A single but positive exception to the latter statement must, however, be made, viz., with reference to "sick headaches." Periodic migraine depends in many instances on the cumulative effect of As., as shown by the positive curative influence of glasses in suitable cases.

Of the subjects with exaggerated asthenopia a large proportion are not in perfect health. Many are distinctly neurotic, as shown by the presence or former presence of functional neuroses, such as other forms of headache, chorea minor, habit-spasms, and other indications of an unstable nervous system. Not a few present the fatigue phenomena of typical neurasthenia in other functions as well. Quite often a history of family neuroses can be obtained. We encounter, however, not so often organic as functional nerve disease. It seems worth noting that alcoholism has figured very little in my records.

More frequent even than demonstrable nervous instability I have observed anæmia in these patients. It is probably the most frequent morbid condition found, either as chlorosis or as secondary anæmia. Anæmia, however, must be looked for by a blood count or examination of mucous surfaces (conjunctiva of lower lid, gums, and hard palate). Irrespective of the presence or absence of nervous instability and anæmia, it can be learned that many of this class of asthenopes have lived under environments bound to injure the health sooner or later. The most common pernicious influences I find to be indoor confinement and want of muscular exercise. Close use of the eyes is not an absolutely necessary factor, since clerks and saleswomen constitute a fair percentage of such sufferers; but, of course, an employee at desk work will notice the annoyance more than

those who only read during leisure hours. Occasionally less common injurious influences are recorded, such as lactation, loss of sleep, or worry. A noticeable factor, too, is the deleterious effect of some previous exhausting disease, especially influenza, sometimes measles. In a small proportion the co-existence of dyspeptic complaints is noted. Constipation is frequent enough, but probably only of minor and not constant etiologic importance.

The rôle of these various morbid conditions in exaggerating the effect of ametropia can be shown by the therapeutic result in suitable cases. Whenever we succeed in curing an anæmia or restoring the patient's general health by proper hygienic measures, we will find the symptoms of exaggerated asthenopia change to the minor annoyance normal to the degree of existing ametropia. Such a favorable result cannot be expected, however, in neurasthenia of long duration, in hereditarily neurotic individuals, or in patients who cannot escape their unhealthy environment.

These various observations can lead to but one inference. Whenever an ametrope complains of exaggerated asthenopic symptoms, we must infer that his nervous system is not in a normal condition, even if he presents no other evidence of it. This is true of a small number of such patients, but the more thoroughly we investigate the matter, the smaller becomes the number of instances of exaggerated asthenopia in apparently perfect health. In some of these apparent exceptions the lowered tolerance to ametropia, or monosymptomatic or localized neurasthenia, as it might be called, is a fairly constant, non-progressive condition, and when we relieve its manifestation by glasses we have done all that can be done. But in many others exaggerated asthenopia is the forerunner of a general breakdown of the nervous system, or its first indication. Proper medical or hygienic advice by the oculist can, in such instances, protect against subsequent ill-health.

ASTHENOPIA NOT DEPENDENT UPON AMETROPIA.—In 20 to 25 % of my patients complaining of asthenopic symptoms, the discomfort was not caused by any error of refraction or insufficiency of accommodation. There was either no

measurable ametropia, or the correction of existing small errors gave but insufficient relief, or none at all.[1]

In a small proportion of these cases (about 5 % of all asthenopes) the discomfort was started in a neurotic or ill-nourished subject, by a blepharitis or a low grade of catarrhal conjunctivitis. But neither exciting cause is at all common compared with the ordinary frequency of these lesions. Either blepharitis or an insignificant conjunctivitis will make the eye of a normal subject a trifle sensitive on prolonged use, but it requires an abnormal sensitiveness of the nervous system in order to have these affections interfere with ordinary eye-work by causing asthenopic distress. Rather more frequently than ordinary catarrhal conjunctivitis, I have found associated with the asthenopia of neurasthenics a slight inflammatory hypertrophy of the superior transition fold, mostly without mucous secretion. In some instances this lesion could be proven as the starting-point of the discomfort by the benefit of local treatment (nitrate-of-silver applications and the use of a suprarenal solution). But this lesion is often quite rebellious to treatment, while in other instances its etiological influence is obscured by complication with hysteria.[2]

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[1] On the basis of extensive observation, I cannot endorse the practice of many to correct every deviation from the emmetropic type. I find uncorrected hypermetropia of 0.5D irrelevant with the rarest exception in youthful subjects, and rarely of importance under the twenty-fifth year of life. Astigmatism of 0.5D is less often tolerated without annoyance than the same degree of H, especially if against the rule or oblique. Yet the proportion of instances in which 0.5D of As. is felt is exceedingly small compared with the common occurrence of this degree of imperfection. Half a dioptry of As. I have never known to produce what I have defined as normal asthenopia, except in connection with presbyopia. Whenever I have seen distress caused by As. of 0.5D it was always of the type of exaggerated asthenopia, and hence indicative of an unstable nervous condition. While I will not deny that in exceptional instances, even a 0.25D cylinder may give some relief, most of the cases I have observed of such low correction were either inconclusive or clear cases of self-deception on the part of the patient. I wish also to state explicitly that I base these descriptions entirely on cases without muscular disturbances. My observations and results have, however, led me to doubt seriously whether asthenopia can be caused by muscular anomalies which remain absolutely latent during ordinary use of the eyes, and can be demonstrated only by suppressing binocular vision through prisms or other artifices.

[2] In a small number of instances asthenopic discomfort may also depend on hypertrophic nasal catarrh with more or less stenosis or suppuration of a nasal sinus. But these patients, too, are all of the neurotic type and in many of them it is difficult to decide whether the asthenopia is the direct consequence of the nasal obstruction or a hysterical manifestation.

In about one per cent. of my asthenopic patients symptoms suggestive of a medium degree of ametropia were caused entirely by a pronounced anæmia. They were all girls or young women who had either perfect refraction, or who were at least not benefited by the correction of a minor error. In every instance in which the anæmia was cured the ocular symptoms and headache disappeared. But only a minority of them remained under my observation for a sufficient length of time to record their cure. Yet I have seen enough positive cases to be able to assert that even in emmetropia a high anæmia can lead to characteristic asthenopia upon use of the eyes.

In another class of cases I have observed intense asthenopic discomfort with an acute onset. They, too, were mostly, but not exclusively, girls, sometimes slightly anæmic, sometimes hitherto in alleged good health. Since a certain day or date they had experienced more or less steady discomfort in their eyes, usually with some dull headache, which symptoms increased so markedly upon using their eyes that work was almost impossible in spite of normal vision. These patients, besides, did not feel well. When seen within the first few days, they showed evidences of gastro-intestinal disturbance—furred tongue, capricious appetite, more or less lassitude, sometimes constipation, occasionally a febrile rise of temperature of half or one degree Fahrenheit. I have observed this condition in more than forty instances. The clinical study of these patients, and especially the therapeutic results, have led me to believe that the intestinal disturbance is the direct cause of the headache, ocular sensitiveness and discomfort. All those seen within the first week or so were entirely relieved of all symptoms by a purge of either calomel or castor oil and a few days' complete rest of the eyes with outdoor exercise. In some of the more persistent instances the pain was permanently suppressed by a few doses of antipyrin. If this condition, however, has lasted a few weeks without attention, it becomes very rebellious, apparently on account of complication with hysteria.

HYSTERICAL ASTHENOPIA.—Although obstinate forms of asthenopia not accounted for by ocular anomalies have been

described since the days of Donders under the names retinal anæsthesia or hyperæsthesia, Kopiopie (Foerster), or nervous asthenopia, they have not been generally considered as a hysterical manifestation.[1] Moreover, most text-books give no exact information regarding their frequency. In my experience hysteria, or if one prefers the term, psychic influence, has been apparent in at least five per cent. of all patients with asthenopic complaints. This figure, however, includes all gradations from the less frequent instances in which hysterical hyperæsthesia of the eyes is the unmistakable diagnosis to those in which an asthenopia due to other influences is either exaggerated by hysteria or perpetuated by it after the other causes have been corrected. The clearest cases are those following traumatism, be it real though slight, or merely imaginary. In others the hysterical complaints are started by a transient conjunctivitis or maintained by a slight chronic conjunctivitis or blepharitis. They may develop in consequence of the acute asthenopia of intestinal origin previously referred to, or they may simply be the result of brooding over the discomfort caused by some error of refraction. I have seen patients—and not so very rarely—whose history taught pointedly that hysterical asthenopia can be suggested by uncalled-for attention by over-zealous oculists.

Hysterical affections are generally described as something more than merely an asthenopic discomfort or headache brought on by use of the eyes. Many of the patients complain of continual pain all day long in and around the eyes. In extreme instances some claim to be unable to use their eyes at all for close work. But this statement is often shown to be untrue or at least much exaggerated by a trial with "new" indifferent glasses, or by the action of the patient while waiting in the ante-room.

Characteristic of hysterical asthenopia is the patient's detailed and emotional description of the suffering, even when this is not stated to be severe. The more the patient's

[1] The best description of hysterical asthenopia is given by French authors; for instance, in Gilles de la Tourette, *Traité de l'hystérie*, 1891, vol. i., chaps. viii. and ix., and Parinaud's "Ocular Manifestations of Hysteria," in Norris and Oliver's *Syst. of Dis. of the Eye* (translated by C. A. Wood), vol. ix., 1900.

narrative shows that his attention has been engrossed by his eyes the more psychic exaggeration can usually be detected. Young children, however, are not so likely to go into details before a strange physician as they may do at home. The diagnosis of hysteria can only be considered when the symptoms cannot be accounted for by any ocular anomaly or systemic condition, like anæmia or pronounced neurasthenia, or when they are out of proportion to any of the causes of asthenopia actually present. In some cases it is impossible to draw a sharp line between the neurasthenic and the psychic factor. Only a minority of these patients present the clinical evidences of hysteria. In many the ocular complaints are the only manifestation. Hysterical discomfort is not often associated with any characteristic ocular stigmata. I have rarely seen with it narrowing of the visual field or the typical reversal of color fields. Demonstrable hyperæsthesia of the skin of the lids to touch and sensitiveness to light are sometimes met with. Constant winking—so-called clonic blepharospasm—is not an uncommon association, especially in nervous children.

It might be questioned whether the name—hysteria—is fully justified in all instances. Many persons otherwise normal can create or perpetuate distressing sensations by concentrating the attention upon some part of the body. Peculiar to hysteria is only the ease with which such fictitious sensations are produced and their subsequent persistence. But between pronounced hysteria and exaggerated emotional impressibility all gradations can be observed. Hence, in some of the instances of asthenopia of this kind it may be more accurate to speak of a psychic exaggeration or psychic origin than to call the patient hysterical.

The only absolute proof of the psychic or hysterical origin of a symptom is the possibility to remove it by influences acting upon the mind. This diagnostic as well as therapeutic test succeeds in many but not all cases of hysterical asthenopia, especially when of recent origin. Positive assurance that no danger threatens the eye, and that recovery will follow, enhances the effect of many an indifferent prescription, or may by itself suffice in the case of an intelligent

patient. I have seen instances repeatedly in which proper glasses had not removed all distress, because the patients still believed that some muscle-error might necessitate an operation, and to whom the assurance that no operation was called for soon gave complete relief. All neurologists, know, however, that hysterical manifestations may in some subjects prove very rebellious, especially after they have lasted long. Such persons we cannot influence through their reason, we must impress the mind with some therapeutic action. Electricity, indifferent collyria, and other suggestive influences may meet with variable success. Of course, all mental therapeutics are bound to fail if there still exists an uncorrected physical reason for the asthenopia. But even when this is absent there remain a number of patients, mainly those distinctly hysterical, who can only get relief by the oblivion resulting from a change of surroundings, or by a mental impression created by means which the conscientious physician hesitates to employ.

DOUBLE OPTIC NEURITIS COMPLICATING WHOOPING-COUGH.*

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A DILIGENT search into the literature has revealed reports of three cases of optic neuritis complicating whooping-cough.

I have thought it best to give the full reports of these cases in addition to report of my own case, and have also included an abstract of a case of ischæmia of the retina, coincident with this disease, for reasons given below.

Alexander's[1] Case I.—Girl, twelve years old, still under treatment, totally blind, October 3, 1887. Whooping-cough preceded blindness two weeks and accompanied by intense headache. On Sept. 15th, the girl noticed that everything grew darker, and on Oct. 3d was totally blind. Pupils rigid, no reaction either reflective or accommodative. Cornea, iris, nothing abnormal, but ophthalmoscope revealed in the fundus of both eyes optic neuritis.

Under treatment blindness decreased and Nov. 1st was able to count fingers at a distance of eight inches. Middle of Nov. still better and decrease of optic neuritis. Whether there will be complete recovery cannot be said on account of advanced stage of atrophy of optic nerve.

Jacoby's[2] Case II.—Girl, six years old, consulted with Dr. Hohlich, Nov. 15, 1888. Patient has had different diseases;

* Read before the Western Ophthalmological and Oto-Laryngological Society at Indianapolis, Ind., April 10, 1903.

when two years old pneumonia accompanied by convulsions. From that time child complained of pains in the occiput. The other children in the family have passed recently through all the stages of whooping-cough, and are recovering.

For some weeks the child has suffered from spasmodic cough and occipital pains. The day before yesterday she asked her mother why she remained away so long as it was getting dark. This aroused the mother's attention that the child was getting blind.

Next day she was examined by Dr. Gruening; his findings were dilatation of pupils ad maximum; no reaction to light or convergence; bilateral neuritis without hemorrhages in the opticus; perception of light quantitative. Another examination revealed that the vision was limited to right eye, and that she was able to distinguish larger objects, like a watch, at a distance of five inches.

Child examined again on 18th: Reaction of left pupil, and larger objects could be seen with both eyes. Vision improves gradually. Was normal on November 28th. Ophthalmoscopic examination was negative. Since that time the child has been all right.

CALLAN'S[3] P. A. CASE III.—Kate M., aged eleven years, small and weak for her years. When six years old had a very severe attack of whooping-cough, lasting three months. Patient was much reduced by severe whoops and mother feared for her life. At the end of three months of the disease the whoops suddenly ceased, but a very dangerous complication arose—viz., brain trouble. Patient on attempting to walk would become dizzy and stagger, complaining of severe headache and pains in the joints and all over the limbs. Mind wandered at times, was obliged to remain in bed for three weeks, and at the end of that time her headache and dizziness had left her, but she could only see very imperfectly.

The mother, who was not a very intelligent person, noticed that the child in walking would run against tables and chairs, showing plainly that she did not see well.

Patient was examined by a competent oculist, who told the mother that the optic nerves were swollen.

For some months there was improvement in the girl's sight but this failed her again. At the present time there is well-marked white atrophy of both discs. V R, movement of hands before the face. V L, fingers at eight feet.

Here we have a case in which a long-continued attack of whooping-cough had brought about a passive congestion of the brain. This led to choked discs and subsequent atrophy.

Dr. H. KNAPP[4] reports a case of retinal ischæmia in whooping-cough in a boy three years old; total blindness; no hemorrhage in fundus or under the conjunctiva. He believed the ischæmia due to hemorrhagic effusion into the sheaths of the optic nerves, or general anæmia; paracentesis improved vision.

Boy died three months later with pneumonia as had been predicted by Professor Loomis. This abstract of the case is reported because of the theory of pathogenesis advanced.

AUTHOR'S CASE.*—Oct. 21, 1902, Ida B., aged eight years, came in my service at the Illinois Charitable Eye and Ear Infirmary on account of subconjunctival ecchymosis of the right eye. Her mother gave me the following history: Four weeks before the patient contracted whooping-cough; has been whooping last two weeks. The coughing seizures, she says, are very severe; has six to eight during the night and fewer during the day. The mother says she is well excepting when she coughs. Has a good appetite, plays out-of-doors as usual, sleeps well excepting when the seizures occur. She has never had any illness save an attack of measles two years ago, which left no sequelæ. She has never had convulsions; does not complain of headaches excepting immediately after coughing spells for a short time.

The patient is the youngest of thirteen children, eight of whom are living and well, the others died of "lung fever" and other diseases of childhood at different ages.

The mother is a well-preserved healthy woman. Father's health is good. The patient is a well-developed, rosy-cheeked girl, with no discoverable evidence of illness except during attacks of coughing.

No motor disturbances to be found; possibly deep reflexes slightly exaggerated. Sense of hearing and smell normal.

Examination of the eyes: R, V $\frac{20}{15}$; L, V $\frac{20}{15}$. Inspection of the right eye, aside from the subconjunctival ecchymosis, showed dilatation of the pupil, which reacts to accommodation and light; to direct light very feebly. My colleague, Dr. J. Brown Loring, on making the ophthalmoscopic examination of the fundus, called my attention to the slight blurring of both discs.

* This case (by invitation) was reported at the December meeting of the Chicago Pediatric Society.

Oct. 25th.—Patient presented herself, having ridden on the street car and walked together a distance of four miles.

V, R and L, $\frac{20}{15}$. Right pupil still dilated and feebly responding to light. Optic discs more blurred. Slight amount of exudate in the retina below the disc, obscuring the temporal branch of the inferior branch of the central artery of the retina at one point.

Analysis of the urine, both chemic and microscopic, negative.

Temperature 99.2°. Pulse 80. Seems well.

Oct. 30th.—Ecchymosis gradually disappearing. V, R and L, $\frac{20}{15}$.

Right pupil responds to light better to-day. Neuritis more pronounced. Patient does not now have or ever has had double vision. Temperature 99.2.° Pulse 80.

Nov. 6th.—No change in condition of patient, excepting that neuritis is more pronounced and temperature higher, 100° F.

Dec. 2d.—V, R and L, $\frac{20}{15}$. Ecchymosis gone. Pupils respond normally to light and accommodation. Examination of urine, both microscopically and chemically, negative. Neuritis more pronounced. Mother says the child plays and acts in every way perfectly well. Whooping-cough subsiding. Temperature same as at last visit, 100° F.

Jan. 15, 1903.—Seems well, but has increased temperature. 99.5° F. Pulse 80. Coughs occasionally. V, R and L, $\frac{20}{15}$.

Fields for red and green, normal. Had difficulty in getting the peripheral fields on account of inability of patient to appreciate the test; both, however, seem normal. Discs still swollen, retinal pigment somewhat disturbed. A blood count, by Dr. E. V. L. Brown, Assistant Pathologist of the Illinois Charitable Eye and Ear Infirmary, and Dr. E. K. Spiece, was made with the following findings:

"Reds,"	4,966,800
"Whites,"	10,000

Therefore, Whites to Reds as 1 to 497.

The blood examination as well as the general appearance of the patient shows that anæmia is not the cause of the neuritis.

March 31st.—Temperature normal. Pulse 76. V, R and L, $\frac{20}{15}$.

Patient attending school, good appetite, apparently well, however has an occasional coughing seizure. Right disc slightly

swollen but evidently well on in regressive stage. The left disc slightly pale but no swelling present.

May 20th.—Swelling of discs entirely gone; a perceptible amount of connective tissue at site of exudate over vessel described above; also a decided deposition of connective tissue in discs. Vision each eye = $\frac{20}{20}$ +.

Prognosis in this case cannot be definitely known at the present time but it is altogether probable that good vision will remain.

Analysis of the above Cases.—A study of these four cases shows that optic neuritis occurs in girls, beginning about the fourteenth day of the convulsive stage in half the cases, opportunity for observing these cases being good; while in the other two cases the complication followed "after some weeks" and "after four months," respectively, the evidence being not so reliable.

Evidence of cerebral trouble—"intense headache" and "severe headache, dizzy, would stagger," "mind wandered" —present only in half the cases. Ophthalmoscopic findings of the three authentically reported cases show optic neuritis without hemorrhage in the opticus.

In only one case (author's) exudate in the retina was reported.

In Dr. Callan's case ophthalmoscopic findings were not given excepting the expression "swollen optic nerves."

Disturbance in motility of the iris is reported in all the cases; in three vision was greatly reduced, while in the fourth there was no disturbance perceptible. Perfect restoration of sight followed in one case (Jacoby's), while normal vision is present in author's case and but little disturbance of sight is probable. In Alexander's case vision improving but no final report made; while in Callan's case white atrophy followed with quantitative vision.

Optic neuritis with and without cerebral complications, as above stated, suggests the probability of the cause not being the same in all cases. In sudden hemiplegia, aphasic disturbances, hemianopsia, etc., coming on during the coughing attacks, modern authors almost unanimously give the credit to *mechanical influences* — that is, rhexis, with the

accompanying hemorrhage into the brain and cerebral meninges, and other circulatory disturbances.

The tetanic expiratory movement which characterizes the coughing attack in this disease increases the intravenous pressure to such an extent that rupture of the smaller veins and capillaries occasionally occurs, producing the above results; in the same way that subcutaneous and submucous ecchymoses are seen in the skin and the mucous membranes.

The optic nerves may become involved in such complications, when meningitis ensues in the form of a descending neuritis.

In the above four cases reported, three of optic neuritis and one of ischæmia of the retina, an attempt at giving the pathogenesis is made by Knapp and Callan only. Knapp explains the case of ischæmia of the retina as being probably due to "hemorrhagic effusion into the sheaths of the optic nerves"; while Callan believes "that long-continued attacks of whooping-cough brought about a passive congestion of the brain with œdema; this led to choked disc and subsequently to atrophy." In this connection it might be well to mention a case reported by Sebrigondi[6] in which a girl of six years is said to have become blind with every coughing spell, produced, he thought, by blood stasis. A. Steffan[6] reports a girl, eight years of age, who saw indistinctly during coughing spells and lost some of the sharpness of sight in the intervals while the spasmodic stage lasted.

Infectious Influences.—The consensus of opinion has not settled upon any particular germ as the cause of this disease.

Pronounced leucocytosis,[7] more precisely speaking lymphocytosis, seems to be the only blood change so far observed.

Pathologic changes in the blood-vessels have not been reported, I believe.

However, the well-known predilection that infectious diseases and toxic states have for the vessels, especially of the nervous system,[8] renders it possible that fatty changes occur in this disorder, in the capillary endothelium of the vessels of the brain tract we call the optic nerve.

This infectious disease is characterized by convulsive or spasmodic manifestations. Whether the infective agent excites the respiratory spasm through central or peripheral irritation, or inflammation, of the nerves supplying the pharynx, is as yet undetermined.

Peripheral neuritis does occur in this disease. Eschner[9] has collected the reports of seven cases. Three of these, the cases of P. J. Moebius,[10] E. Mackey,[11] and M. L. Guinon,[12] unquestionably should be so classified. F. A. Craig[13] reports a case which Eschner believes to be inflammation of the 6th and 7th nerves.

The optic neuritis in the case I have reported is probably intraocular, for the especial reason that there has been no disturbance of central vision, no scotoma for red or green, and for the additional reason that peripheral vision is good.

I think it is due to the direct action of the toxins of whooping-cough upon the nerve tissue. The oncoming of the inflammation during the most acute period of the disease, the second week of the convulsive stage, and the gradual recession of both the neuritis and the spasmodic cough, might favor either the mechanical or the infection theory. If the cause is mechanical, the disturbance is exerted *through* the veins and not *outside* of them, as in hemorrhagic extravasation or œdema of the optic-nerve sheaths, for the reason that there has been absence of symptoms of brain lesion.

The blood stasis is but a temporary symptom, the equilibrium of the circulation being soon re-established. It would not account for this condition unless a chronic local venous engorgement of the nerve-head resulted therefrom, accompanied by diapedesis of the leucocytes, etc. Such a condition can, I think, be better explained as resulting from the influence of toxins according to Metschnikoff's theory of phagocytosis.

Generalizations derived from the study of four cases can be, at most, only suggestive.

Conclusions suggested:

1. Optic neuritis complicating whooping-cough seems to occur most frequently in girls (four cases all girls).

2. It occurs with or without evidence of cerebral complications.

3. Vision may or may not be disturbed.

4. Prognosis as to sight good when no cerebral complications exist.

5. That optic neuritis may result from direct action of toxins of pertussis upon the nerve-head.

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PERISCOPIC LENSES.

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In 1901 I published in these Archives a paper on periscopic lenses. The table there given of the requisite curvatures of the two surfaces of the lenses is not absolutely correct for spectacles of the usual size, as I had erroneously considered the axial thickness of the lens to be constant. I find, however, that when the increased thickness of a strong convex glass is taken into account, an appreciable deviation from the curvatures there given becomes manifest. As several ophthalmic surgeons have expressed their difficulty in getting periscopic lenses made, or in writing a prescription for them, I send this simpler and more correct table for their use. By this one can see that a + 6D periscopic lens is a meniscus of which the anterior surface has a convex curvature corresponding to that of a + 15D lens, while the posterior or ocular surface has a concave curvature corresponding to that of a −9D lens. Spectacles ordered according to this table will be accurately periscopic for all eccentric vision within a solid angle of 50° between the powers of +8 D and − 14D. For powers beyond this range extreme eccentric vision will not be so good as centric vision—*e. g.*, with the + 12D lens distinct vision will be obtained of any object about 20° on either side of the middle line, or of any object that lies within a solid cone of 40°.

I might also point out that since my paper was written a German firm of opticians have secured the monopoly of manufacturing toric lenses, so that the difficulty of obtaining

periscopic lenses for astigmatic patients in other countries has considerably increased.

The index of refraction of the glass is assumed to be 1.54.

Power	Anterior Surface	Posterior Surface
− 1D	+ 5.5D	− 6.5D
− 2D	+ 5D	− 7D
− 3D	+ 4.5D	− 7.5D
− 4D	+ 4D	− 8D
− 5D	+ 3.5D	− 8.5D
− 6D	+ 3D	− 9D
− 7D	+ 2.5D	− 9.5D
− 8D	+ 2D	− 10D
− 9D	+ 1D	− 10D
− 10D	Plane	− 10D
− 12D	———	− 12D
− 14D	———	− 14D
− 16D	− .5D	− 15.5D
+ 1D	+ 6D	− 5D
+ 2D	+ 8D	− 6D
+ 3D	+ 10D	− 7D
+ 4D	+ 12D	− 8D
+ 5D	+ 13D	− 8D
+ 6D	+ 15D	− 9D
+ 7D	+ 16.5D	− 9.5D
+ 8D	+ 17.75D	− 9.75D
+ 9D	+ 19.5D	− 10.5D
+ 10D	+ 21D	− 11D
+ 12D	+ 23D	− 11D
+ 15D	+ 27D	− 12D

POLYPUS OF THE LOWER CANALICULUS.

By Dr. S. C. AYRES, Cincinnati.

POLYPI of the lachrymal passages are very rarely seen and the literature on the subject is quite barren of cases reported. While this is true of the nasal duct, it is also a fact that polypi of the canaliculi are still rarer. Only one has ever come under my observation and its rarity justifies its publication.

Mr. C. was seen in March, 1902, on account of an annoying epiphora of the right eye which he had had for a year or more past. The eye was healthy in all respects and vision good. He was presbyopic and wore glasses for reading. There was no mucus in the tear sac and nothing to indicate a stricture of the nasal duct. The punctum was displaced and not in contact with the ocular conjunctiva. It pouted out some, but not differently from many I had seen. With an Anel's syringe water passed readily through the nasal duct to the nose. The next day I again used the syringe and water passed as before. As the washing out of the duct had given no relief, I decided to slit up the canaliculus. This was done with a Weber's blunt-pointed knife, and as I finished the incision I was surprised to see a small red polypus lying in the inner angle of the eye. It was attached by a long thread-like pedicle, which seemed to pass entirely through the canal and have its attachment near its inner end or possibly just inside the tear sac. The polyp was pear-shaped and about the size of a grape seed. Slight traction on it broke the slender pedicle and it came away. The epiphora was relieved at once.

Mucous polypi of the tear sac were observed by Janin, 1772; Niess, 1822; Grillo, 1834; Desmarres, 1854. The last in *Maladies des yeux*, tome i., 2d edition, reports a case of

polypus of the tear sac as large as two grains of millet, with very marked distension of the papilla. He made an attempt to squeeze it out through the papilla but being friable it broke off, and he then made an incision through the skin and removed it, and then cauterized the tear sac with silver nitrate.

Von Graefe in vol. i. of his *Archives* (1854) reports two cases of polypus of the tear sac. One was in the person of a girl ten years of age and the other in a man of twenty-four. The former was attached to the posterior wall of the sac and the latter to the anterior wall. The polypi were removed through incisions into the sac which was then obliterated by the use of the actual cautery.

DeWecker, in his *Ocular Therapeutics*, London, 1879, translated by Dr. Litton Forbes, refers to a patient fifty years of age "in whom the inferior lachrymal punctum was traversed by a small polypus about the size of a grain of millet, the pedicle of which was, on section, seen to be situated close to the punctum."

Dr. Theobald, in Norris and Oliver's *System of Diseases of the Eye*, says in his article on "Diseases of the Lachrymal Apparatus," "polypi have been met with (but very rarely) in the canaliculi. They produce epiphora and in consequence of this may set up a chronic conjunctivitis."

E. Hertel (*Graefe's Archiv*, vol. xlviii., p. 50), in an article on "The Pathological Anatomy of Diseases of the Lachrymal Passages," reports a case of, as he says, "a genuine mucous polypus of the tear sac such as we often see in the nose, uterus, etc."

Dr. Strzeminski of Vilna, Russia, in vol. xlix., *Graefe's Archiv*, p. 339, reports a case of polypus of the tear sac.

Parisetti, in a communication to the Royal Academy of Medicine of Rome in December, 1897 (*Bull. della Accademia medic. di Roma*, 1898), reported a case of polypus of the upper canaliculus. As to its rarity, he says that among 50,000 cases in foreign clinics and among those in his own practice this was the first time he had had an opportunity to observe this disease. His case occurred in the person of a young woman twenty-three years of age. There was a marked distension of the canaliculus, its skin presenting a tense and

glistening appearance. It was a firm tumor, but fluctuation could be detected. He first aspirated the tumor through the canal and evacuated some serous fluid. He then slit the canaliculus and a small round hard tumor presented itself. It was pedunculated and attached to the upper wall of the canal. Microscopic examination of the tumor showed it to be a true mucous polypus. He further states that this is the first time any one had demonstrated in a positive manner the possibility of the formation in the canaliculus of a tumor, which, because of its histological structure, deserves the name of polypus.

COMMENTS.—In nearly all cases of polypi of the lachrymal passages, the growths originate and develop in the tear sac. Even where the tumor was confined to the canaliculus, the pedicle would most naturally have its origin in the mucous membrane lining the sac. Parisetti's case is an exception, as he states it was attached to the upper wall of the canal. In my own case I cannot say positively whether the pedicle was attached to the wall of the canal or the sac, as it broke when tension was made upon it. I am inclined to think that some of the intractable cases of blennorrhœa of the tear sac are due to soft flat polypoid growths which partly fill the sac. They are so organized that they resist the ordinary treatment. In such cases I think we are quite justified in opening the sac through the skin and inspecting the mucous membrane, and, if such growths are found, in curetting them and applying appropriate caustic treatment. I would not recommend *le fer rouge* or *la pierre infernale*, nor any destructive caustic, until all other measures had failed. Every effort should be made to save the tear sac if possible. An inspection of the mucous membrane of the tear sac is a harmless procedure and can be safely resorted to in cases of obstinate blennorrhœa. The mucous membrane in such cases must closely resemble the condition seen in mixed trachoma. *Expression* has done much for the relief of trachoma, and it is quite possible that curettement of the tear sac might help to relieve many obstinate blennorrhœas.

THE EXTIRPATION OF THE LACHRYMAL SAC; ITS INDICATIONS AND TECHNIQUE.[1]

By Dr. ARNOLD KNAPP.

Indications:—1. Chronic purulent dacryocystitis; if of some standing and antiseptic treatment has not succeeded in curing the suppurating character or if the sac is dilated. In this group of cases the great danger to the eye in possible corneal affections should not be lost sight of.

2. Repeated attacks of acute dacryocystitis with abscess.

3. Whenever the sac is dilated whether the contents can be expressed or not.

4. Lachrymal fistula.

Methods:—The anæsthesia may be local or general, the local being only suitable in the absence of acute inflammatory conditions. The superficial cutaneous incision may be anæsthetized by the ethyl-chloride spray or by the usual infiltration-anæsthesia. Subsequently the parts can be rendered more or less insensitive by the local applications of a cocaine solution, and in suitable cases it will be found of advantage to inject a weak solution of cocaine into the sac before operation. The incision begins just below the internal canthal ligament and passes down and out along the prominent orbital margin for from $1\frac{1}{2}$ to $2\frac{1}{2}$*cm.* The ligament may be divided or not. If it should be divided, care must be taken to carefully join the divided parts at the termination of the operation, so as to prevent a possible sinking in of the caruncle. The incision is carried through the subcutaneous tissue and the anterior fibres of the apo-

[1] Read at Section on Ophthalmology, New York Academy of Medicine, Meeting of March, 1903.

neurosis until the sac itself is exposed. This structure is usually recognized by its pale red or bluish-red smooth uniform surface.

Hemorrhage from the lower part of the incision is apt to be annoying, but can generally be thoroughly controlled by a suitable introduction of the retractors and by compression. The sac is then isolated by blunt dissection from its inner wall; proceeding upwards, the cupola is freed and the sac can be more or less lifted out of the fossa. The outer surface is usually more adherent and has to be separated by cutting. This can be easily done by a pair of small blunt scissors, the attachment above and outwards to the two canaliculi being carefully separated.

The sac is cut off as low down in the lachrymal canal as possible and the canal is thoroughly curetted with a small spoon. With the aid of reflected light, after the edges of the wound are properly separated, a careful inspection is then made of the walls and the roof of the lachrymal fossa with a view of detecting any remaining islet of mucous membrane, granulations, inflamed periosteum, or carious bone. These possible complications must all be properly met and radically treated. We must be especially careful to see that the top of the lachrymal fossa is perfectly clean. If the bone on the inner wall (lachrymal bone) should prove to be diseased and superficial curetting be deemed not sufficient, a free opening should be made right through this into the nose. This enables the removal of the diseased bone and also insures proper drainage, the opening entering the nose in the anterior part of the middle meatus just below the head of the middle turbinal.

The operation is concluded by the exact approximation of the wound edges with two or three sutures, and the cavity is obliterated by proper pressure, and this pressure must be kept up in the dressings for the next few days.

The difficulty and success of the operation vary with the amount of inflammation and adhesions present. Operation in the presence of an acute inflammatory condition is of course more apt to be unsatisfactory as far as smooth and rapid healing is concerned. Still I have found that, unless

the abscess had thinned the superficial integument, the attempt can be made to obtain primary union after extirpating the sac under these conditions. It may be necessary to keep the wound packed for one or two days and then to approximate the incision by sutures.

Results:—Primary union with obliteration of the cavity can be secured in most cases. The cases which have proved the most obstinate in my hands have been in children where the dacryocystitis was complicated with disease of the superior maxilla. The scar left in the cases which healed by primary union is practically invisible. The lachrymation has in my cases been insignificant; it has always been less than before operation, due presumably to the removal of the inflammatory condition. The patients have not found it necessary to apply for further treatment to overcome this symptom.

For *Discussion*, see p. 290 of this volume.

THE MENTAL DERANGEMENT WHICH IS OCCASIONALLY DEVELOPED IN PATIENTS IN EYE-HOSPITALS.[1]

By CHARLES J. KIPP, M.D., Newark, N. J.

THE following cases have been under my personal observation:

1. An American woman, fifty years of age, a farmer's wife and a member of a Protestant church. I *extracted a cataract* from her left eye. At that time I bandaged both eyes after the operation, and kept the patient in bed, in a dark room. Two days after the operation, the patient became very restless, could not sleep, complained of the stuffy air in the room, expressed fear that the nurses, who were nuns, were trying to do her injury because she was a Protestant. She said that the odor of incense which came up from the chapel stupefied her. At night she raved and screamed, tore the bandages from her eyes, and would not stay in bed. I tried to calm her and removed the bandage from the sound eye. I gave her morphine in large doses, but without producing sleep. I then allowed her to get out of bed and ordered the nurse not to allow the patient out of her sight; but, notwithstanding this precaution, she escaped from the hospital, insufficiently clad, and walked six miles to her home. As soon as we discovered her absence we instituted a search and traced her to her home. On the following day she was perfectly quiet and apparently in perfect mental health; she did not remember how she had left the hospital, or how she got home. Her family assured me that on the day after her arrival home her mind was perfectly clear and has been so since. Her eye healed without irritation and the sight is good.

[1] Read before the Section on Ophthalmology, New York Academy of Medicine, May 18, 1903.

2. An Irishman, sixty years of age, a hatter by trade, came from a village near here; he had all his life been a total abstainer from alcoholic drinks. He was *operated on for cataract.* He was alone in a small but well-lighted room; only one eye had been bandaged. He was kept in bed only a few days after the operation. On the twelfth day after the operation he became very restless, could not sleep, and complained that he heard rats and mice running about the room. One day while I was talking to him he told me that he saw snakes and lizards running about the room and begged me to protect him against them. I sent him home at once, and two days later his mind was in a normal condition. He told me afterward that he did not remember that he had seen snakes while in the hospital. His eye made a good recovery.

3. A German, about thirty-five years of age, the father of a large family, was struck in the right eye by a *fragment of iron.* I admitted him to the hospital for the purpose of *removing the lens in which the iron was embedded.* Other more urgent operations caused me to defer the operation for three days, during which time he had a drop of a 1-per-cent. solution of sulphate of atropine instilled in the wounded eye once daily. He was not confined to his bed and neither eye was bandaged. He appeared to be cheerful when I saw him in the afternoon of the third day after admission, but while speaking he was brushing imaginary bugs off from his person and articles about him. During the night following he jumped out of one of the windows of the ward, and fell a distance of about ten feet, breaking his nose and dislocating both ankles, lacerating his face, and bruising his body very badly. He was at once taken to his home where his mental equilibrium was soon restored. He was then taken to a general hospital where he remained for six weeks; from there he came back to us and was put in the same bed which he had occupied before. I removed the iron from the eye and kept him in the hospital for about ten days. During this time he was perfectly quiet, slept well, and had no return of the mental trouble. I learned afterwards that this man was an amiable, quiet family man who drank beer occasionally but never to excess. He did not remember the occurrences of the night of his desertion from our hospital.

4. A German, about forty-five years of age, a driver of a brewery wagon, who drank beer habitually but not to excess, was admitted to the hospital on account of a *severe injury to his left*

eye. He was put to bed and had warm compresses applied and atropine instilled in his eye several times daily. He was in a room with several other men, and the room was well lighted. One of his eyes was covered most of the time; he was gradually getting better when about the twelfth day of his stay he became restless, could not sleep, although morphine was administered, and at last became delirious and very noisy. I sent for his wife to come to the hospital and to stay with him. While she was on the way, and I was standing near his bed and telling him that his wife was coming to him, he asked of me permission to go to the bath room. I allowed him to do so, and as soon as he was out of bed he ran to a window, and before we could stop him he had smashed the glass with his fist, put his head out the window, and screamed at the top of his voice "Murder, Police, Help," etc. With the aid of several men we got him back to bed, and his wife, who had arrived by this time, endeavored to calm him, but it was of no use. I had him taken home in a carriage. Next day his wife reported that he was calm and self-possessed and had no recollection of his doings in the hospital ward. He has remained in good mental health since then.

5. An American woman, sixty years of age, from the country, was admitted to the hospital for *acute glaucoma* of the left eye. The other eye was blind. She was put into a small, airy, cheerful room. I made an iridectomy under ether. For a week after the operation the operated eye was closed by a bandage, and as the other eye was blind she was in total darkness. She became restless and sleepless about the *fifth day after the operation*, and on the sixth and seventh could hardly be kept in bed. A nurse had to be with her all the time to prevent her from leaving her bed and room. At that time there was a report that there were many cases of small-pox in our city, and people living in the surrounding country were afraid to come to the city for fear of contracting the disease. This woman had had the same fear, and in her wild delirium would say that she had heard many cases of small-pox taken from our hospital during the night. As her eye was not in a condition for her to go out, I transferred her to another and larger room, and made one of her daughters stay with her day and night. This quieted the woman a good deal but not entirely. She recovered her mental health completely in a few days after her arrival home. She has been well since.

6. An American mechanic, sixty years of age, was admitted

for *cataract extraction.* He had a large family who lived about a mile from the hospital; he was visited by members of his family every few days. One of his eyes was covered by a shield, but the other was left open. The room in which he was placed was very light and there were several other men in it. He became restless and sleepless and wanted to get out of bed about a week after the operation. He did not complain of pain anywhere and his eye was doing well. He was given morphine, chloral, and other narcotics, but these had no effect on him. On the *tenth day, about four o'clock in the morning, he suddenly attacked the nurse and tried to kill her by striking her with a chair.* After driving her from the ward, he escaped from the hospital in his night clothes, with bare feet, and walked about a mile to his home. Strange to say, he was not seen by a policeman or other person, so far as I knew. His family were of course greatly astonished to see him. He was put to bed and immediately went to sleep. After eight hours' sleep he awakened all right in his mind and was without difficulty induced by his family to return to us. After that he gave us no trouble. He has since been well mentally.

7. A most distressing case was that of a Polander about fifty years of age, a resident of another city, who was brought to this hospital on account of a *severe injury to the cornea of his right eye*, due to a lime burn. This man was in robust health, very muscular and strong. He suffered much pain from his injured eye. He was put to bed and warm applications were made to the left eye, while the right eye was not covered; he was in a light room with several other men. He was able to converse with but one person about the house, who saw him only about once daily, and then only for a minute. He became sleepless and restless soon after admission but was kept in bed for several weeks. Three days after he had been permitted to be up, and to walk about the wards he was told that he could go home next day. I saw him late in the afternoon of this day and noticed nothing in the man's behavior which pointed towards mental derangement. He retired about nine o'clock. Shortly after two o'clock in the morning an orderly who slept in a room adjoining the ward thought he heard a window sash raised, and immediately began an examination of the windows in the ward. He found one open, and on looking about the ward found that the Polander's bed was empty. A search was immediately instituted, but was unsuccessful. About an hour afterwards the patient was brought to the hospital by

people who had found him a block away from the hospital. He was in his night clothes and bare feet; the ground was covered with snow at the time. He was much bruised and cut about the body and his left femur was fractured. Through an interpreter I learned that this man was greatly worried about his family who were in great want,—were in fact without food and had been begging him to come home. He did not remember how he got out of the hospital, nor that he climbed over two high fences to reach the place where he was found. I transferred this man to a general hospital. His mind has been clear since he entered there. I may mention here that the man was under no restraint whatever while in our hospital, and could have walked out of the hospital any time if he had wanted to do so. His fracture healed very slowly, and on the ninety-sixth day after his admission to the general hospital it was found that he was unable to use the limb. Up to this time he had been perfectly quiet and had shown no signs of mental disturbance; but on the following day, early in the morning, he threw himself out of a window in the fourth story of the hospital, and was found dead on the pavement beneath.

8. An old German, about sixty years of age, in good general health and apparently of sound mind, who had, some time before he came to us, lived and slept in a beer-saloon where he did chores. He was admitted for the operation of *extraction of cataract.* He was very dirty. The *operation was followed by little reaction* and no pain. The operated eye was covered by a shield; the other, which was also impaired in vision, was left open. He was in a well-lighted room with other men; he became restless and could not sleep. On the sixth day after the operation and during the following night he could not be kept in bed, and kept the other patients awake by irrational loud talk; he insisted on going to the place where he had slept before he came here. I sent him there with one of our orderlies; he stayed at this place a day and a night and then came back to us, begging us to take him in. He was quite rational and gave us no further trouble during the two weeks that we kept him.

9. An Irishwoman about seventy-five years of age, who had been living with friends, not in a home of her own, entered the hospital for the purpose of having a cataract extracted. She had been totally blind for some months; she was apparently in excellent general health; she was very talkative but quite rational. I *extracted the cataract from one eye*, and for a week after the

operated eye was covered by a shield; the other eye was open. She was in a well-lighted room with other women. The operation was followed by a secondary cataract, and her sight for some weeks after the operation was not much better than it had been before the extraction. I kept her in the hospital with a view of making a secondary operation. About *five weeks after admission she became restless*, could not sleep, and walked about the room at night. This restlessness increased from day to day. She refused to take medicine and even food, fearing that it contained poison. At last she became violent, shouting and screaming at the top of her voice all day and night, and a nurse had to be with her all the time to prevent her from escaping. As I was unable to reach any of the people with whom she had lived before she came to us, I made arrangements to have her taken to the hospital for the insane, and was about to transfer her there when her son turned up and took her to her former abode. She returned to us two weeks later for the secondary operation, which was successful in restoring her vision. I learned that she became quiet as soon as she reached her former abode, and that she had been perfectly quiet and rational since. During her second stay in the hospital she behaved like a sensible woman.

10. An Irishman, seventy-eight years of age, in good general health, but blind in both eyes from cataract, was admitted for operation. He occupied a well-lighted room in which there were other men. The operation was not followed by a marked reaction and he had no pain. He *began to show his symptoms of mental derangement on the eleventh day after the operation;* he sang and shouted day and night. Sulphonal quieted him somewhat, but it required the presence of several people of his household near his bed to prevent his desertion from the hospital. He was sent home about the fifteenth day, and from that time on his mental equilibrium was restored.

All the cases so far related were cases of surgical operation on the eye, or accidental traumatic injuries of the eye. I have also record of two cases of transient mental aberration in which the patient came into the hospital for a disease of the eye.

11. One was an Irishman, forty-six years of age, in good general health; he had an ulcer of the cornea of one eye; the other was healthy and had good vision. He was in a well-lighted room

with other men. The diseased eye was covered with a compress most of the time; the other was left open. He had locally a 1-per-cent. solution of atropine three times daily. He showed symptoms of *mental derangement four days after admission.* He was very noisy and unmanageable. He recovered his mental equilibrium soon after his return home and has manifested no signs of mental disease since.

12. An Irishman, thirty-five years of age, in good general health, but having an infected ulcer of the cornea of one eye, was placed in the same kind of a room, and received the same treatment as the man last mentioned. He also showed evidence of *mental derangement on the third day after admission.* He refused food and drink and would take no medicine. He was somewhat quieted by hypodermic injections of morphine, but had to be sent home as he disturbed everybody in the room. He speedily recovered after reaching home and has been mentally sound since then.

REMARKS.—All of the cases here reported occurred in the wards of eye-hospitals. Some occupied darkened rooms, but the great majority were treated in well-lighted, cheerful rooms; some were in a room by themselves, but the majority had been in rooms with three or four others. Some were confined to bed, others were dressed and were sitting up and walking about the wards. Only one had both eyes bandaged at the time the mental trouble developed. All the others had either only one eye covered by a shield or had both eyes open when the first symptoms of mental trouble showed themselves. Some had good sight in the uncovered eye, the others had more or less impaired vision in it. Some came from our city, but most of them from some distance. Both sexes were represented, but males predominated.

My youngest patient was about thirty years of age, the majority were over fifty. All were in good general health, and were not suffering pain in their eyes when the outbreak occurred. All were mentally sound when admitted, and also of average intelligence. All were poor, some of them paupers. Most of them could talk English, but some of them could not speak any language with which the nurses

were familiar. Most of the cases had been in the hospital more than a week and some only a few days when the mental trouble began. In most of the cases the delirium developed after operation on the eye, but in two no operations had been done and had not even been proposed to the patients. In the great majority of the cases a solution of atropine had been instilled several times daily, but in a few no mydriatic of any kind had been used before the outbreak. *Recovery from the mental trouble resulted very speedily in all cases in which we could return the patients to their former homes immediately after the outbreak.* A considerable improvement was secured by having the members of the household stay with them and by transferring them to other quarters. In the cases in which the patients' injuries resulting from the attempt to escape were so grave as to require their transfer to a general hospital, the shock or perhaps the change of environment produced a cure of the mental disease. With regard to the previous habits of these people, I have no reliable information; some of them were undoubtedly what are called moderate drinkers, none were drunkards, however, and a number of them were total abstainers from alcoholic drinks; of this I have positive knowledge. In every case in which it was ascertained that the patient was accustomed to drink alcoholic beverages, small doses of alcohol were given several times daily during their stay in the hospital.

SICHEL[1] is generally regarded as the first to call attention to these psychoses as occurring after cataract extractions. He observed eight cases, all in old people. He describes it as an afrebrile delirium. The closure of the lids, in consequence of which the patients no longer know where they are or what has been done to them, appears to be the only cause. They are, so to speak, *dépaysés*. Since Sichel's publication similar cases have been frequently observed and described, and most authors[2] have attributed the mental disturbances to the same cause.

[1] "Sur une espèce particulière de délire sénile qui survient quelquefois après l'extraction de la cataracte," *Annales d'oculist.*, Bd., xlix., S. 154, 1863.

[2] See Snellen, *Graefe-Saemisch Handbuch*, second edition, vol. iv., part 2, p. 112.

SCHMIDT-RIMPLER[1] has this to say on the subject: "After operations on the eye and in the dark rooms of eye-hospitals, we see occasionally the development of peculiar psychoses, the chief characteristic of which is, on the whole, mental confusion; formerly these were designated a delirium, a state of inability to find one's bearings, and incoherence, followed often by amnesia. In modern psychiatry this designation is not often employed; its application is at present restricted to the delirium tremens, and this is classed among the acute hallucinatory paranoia. If we regard primary insane conceptions (paranoia simplex) or hallucinations (paranoia hallucinatoria) as the chief symptoms of paranoia, then the majority of the psychoses under consideration belong to this class.

"The course varies somewhat: usually the patient becomes restless towards evening or in the night; asks to be permitted to leave the bed, or rises without permission; tears the bandages from his eyes; frequently screams; thinks that he is in his own home; converses with imaginary persons, sees individuals who threaten to do him violence or to carry him off; he is in fear of a conflagration or that some other dreadful occurrence will take place. This condition may last several days. If we converse with these people after an attack, they frequently answer quite rationally, but suddenly during the conversation they again are seized with a delusion; sometimes they assert that their previous experiences have been real occurrences. Loss or weakness of memory is also occasionally seen. Often the patients have also a motorial restlessness, they are constantly picking at the bedclothes, and when they are out of bed, walk restlessly up and down the room; sometimes they are incessantly wiping imaginary dust from all articles within their reach. Some of the patients are, however, free from hallucinations, but they are plagued by delusions. Fever is not present."

The same author has shown[2] that these psychoses are observed not only after eye operations, but develop without

[1] *Die Erkrankungen des Auges im Zusammenhang mit anderen Krankheiten*, 1898, p. 291.

[2] *Archiv f. Psychiatrie u. Nervenkrankheiten*, vol. ix., p. 233.

them in cases where the eyes are bandaged and the patients kept in dark rooms. In several of the cases related by me no operation had been performed and none had been even suggested. In one case the patient was waiting for an operation when he became deranged.

Schmidt-Rimpler further says[1]: "They are by no means due to the impression made on the patient by the operation, which is often trivial, but to the exclusion of the light to which they are accustomed. We are permitted to assume that the organs of sense, in a way, regulate the psychical processes which start and end in the brain. They give constant stimulations, independent of the various perceptions which can be estimated. They keep man mentally awake and clear. If they are excluded, a sort of dream life is produced."

All of which is very interesting, but as in almost all of my cases, the light was not excluded by a bandage and patients were not kept in dark rooms, it is evident that the exclusion of light cannot be regarded as the cause of the mental derangement.

According to the same author: "It is probable, however, that a certain mental weakness exists already at the time these psychoses make their appearance. This will account for the occurrence mostly in old people, in alcoholics, and in mentally weak persons. I do not remember ever to have observed this condition in persons in perfect health, especially among members of the educated class, who were still in mental vigor."

HIRSCHBERG[2] thinks that the sensorium of old people is in a labile equilibrium and the deprivation of all sense impressions starts the delirium.

LUNKIEWICZ[3] thinks that the instillation of atropine solution is alone responsible for the mental disturbances, but this seems to me highly improbable, as no other symptoms of atropine poisoning were present in any one of the cases observed by me; moreover, this remedy had not been used at all in some of my own cases, as well as some reported by Posey (see below), and in one recorded by Hirschberg in 1876.

[1] *Op. cit.* [2] Rau, *Centralbl. f. Augenheilk.*, 1899, p. 47. [3] See Rau.

v. FRANKL-HOCHWART,[1] quoted by Schmidt-Rimpler, recognizes four groups of psychoses after eye operations: First, hallucinatory insanity in non-alcoholics; these patients were from thirty to ninety years of age; the disease began mostly within a few days after the operation, seldom later. Second, simply confusion in senile individuals; in these cases there were no hallucinations; in several of these cases the disease progressed to dementia. Third, delirium in alcoholics; it appeared earlier than in the other cases and healed more quickly. Fourth, inanition confusion in very reduced individuals; three of these died. Schmidt-Rimpler commenting on the above expresses surprise at the length of time required for a cure in these cases. He says that he has never observed this, nor such serious consequences; he is inclined to think that in these cases psychic disturbances were already present when the patients entered the eye-hospital.

I have been unable to find a reference to this subject in the writings of ophthalmic surgeons practising in Great Britain. In Bombay, East India, mental aberration after eye operations seems to be practically unknown, according to N. Herbert,[2] who had made 2354 extractions up to November 5, 1902, and who excludes the light from both eyes for several days after the operation.

I can find but little on this subject in American literature. Dr. W. C. Posey, of Philadelphia, in a paper read before the College of Physicians of Philadelphia, Section on Ophthalmology, February 20, 1900,[3] reported 24 cases of delirium, in 19 of which a cataract had been removed, in 3 an iridectomy had been done, and in 2 there were extensive wounds of the eye. All the subjects were over sixty, except the traumatic subjects who were much younger. The delirium developed in the first twenty-four hours after the operation in 2, on the second day in 8, on the third day in 6, and on the fourth day in 2. No atropine was used in 6 instances. Its employment did not seem to have any influence whatsoever upon the mental condition. Both eyes

[1] "Ueber Psychosen nach Augenoperationen," *Jahresbericht f. Psychiatrie*, vol. ii., parts 1 and 2, 1899.
[2] *The Practical Details of Cataract Extraction*, London, 1903.
[3] *Ophthalmic Review*, London, vol. xix., 235.

were bandaged after the operation in every instance, but the dressing was removed from the unoperated eye in 9 cases as soon as the delirium manifested itself, without giving any appreciable relief to the mental condition. It was specifically noted in 9 cases that there was absolutely no tendency towards mental derangement when they entered. Evidence of previous tendency was present in only 2 senile and in the traumatic cases. The delirium was of the same character in all, beginning with a mild restlessness which rapidly developed in an active delirium with hallucinations and ideas of persecution, but passing rapidly under control by the proper administration of narcotics; permanent affections of the brain being marked in not a single instance. The writer believes that the cause of delirium is largely psychical, and he agrees with Parinaud that it is due to the *preoccupation upon the part of the patient prior to and after the operation.* What the other features are, which in addition to the preoccupation determine the delirium, are as yet unknown. The frequency with which the delirium is encountered should, however, be recognized and proper treatment,—namely chloral and bromides—be administered at its first appearance. The removal of the bandage from the unoperated eye and the discontinuance of the atropine are not advised. Constant oversight and judicious tactful nursing are most essential, and rapid amelioration of the mental condition follows the installation of a proper nurse by the bedside.

In the discussion following the reading of this paper, Dr. DE SCHWEINITZ mentioned a case in which after operation on one and bandaging both eyes maniacal delirium developed; followed by dementia lasting two months. Two years later the other eye was operated on and the bandage applied only to this eye. No mental disturbances followed.

Dr. ZIMMERMAN had seen numerous cases in Wills Hospital. Unbandaging the sound eye and getting the patient out of bed was the usual treatment. Dr. VEASY reported two cases in which both eyes had been bandaged and the removal of the bandage from the healthy eye restored the patient's mental health. Dr. RANDALL had removed

the bandage from the sound eye, but with absolutely no result, the delirium continuing uninterruptedly for five days.

Dr. HARLAN stated that the delirium had many types and causes and that no one explanation would be satisfactory for all cases, therefore the treatment must be diversified to meet unusual requirements.

I am no alienist, and have seen but little of insanity. The impression which these cases have made upon me is *that these psychoses were the result of a change in the patient's environment and to an increasing longing to get away from the new surroundings.* This view seems to me to be supported by the fact that all signs of mental disturbances passed away as soon as the patients reached their former homes, or were much quieted, if not entirely restored, by the presence of members of the household from which they came.

I may mention here that, although I have treated and operated many cases at their own homes, I have never observed mental derangement in this class of patients.

I call it a *homesickness, nostalgia*, which ends in a form of melancholia with homicidal and suicidal propensities.

In the treatment of these cases I have never resorted to mechanical restraints, but in the future I shall not hesitate to resort to it when circumstances prevent the immediate removal or return of the patients to their homes. The very serious injury which some of my patients sustained in the delirium, and the danger to which the attendants who watched them were often exposed, would doubtless have been prevented if I had resorted to such measures. The use of hypnotics is of course indicated, but often very large and dangerous doses are required to quiet the patients. Many of them, moreover, absolutely refuse to take medicines and food and drink by the mouth, as they fear they contain poison. In such cases only remedies can be employed that can be given hypodermically. But the quickest way to restore mental equilibrium is to return the patient to his home, no matter how humble or how unsanitary it may be. If this is impracticable, transfer him to another house, or, at least, to another room, and give him the company of some members of the household from which he came.

REPORT OF THE MEETINGS OF THE OPHTHALMOLOGICAL SECTION OF THE NEW YORK ACADEMY OF MEDICINE, HELD ON MONDAY EVENINGS, APRIL 20 AND MAY 18, 1903.

By Dr. HENRY H. TYSON, Secretary.

MEETING OF APRIL 20. DR. A. DUANE, PRESIDENT, IN THE CHAIR.

Dr. Lewis presented a **case of bilateral hemorrhagic neuroretinitis of obscure origin.** Patient was a man aged thirty-four years, longshoreman, apparently in good health. Denies syphilis —no definite symptoms of it. Last July he first noticed headaches all over his head, followed by impaired vision in the left eye and later in the right. Received no treatment until last January, when he was given specific treatment. Was examined by Dr. Lewis in March. Urine normal. Blood examination normal; headaches vary. No light perception in either eye, pupils dilated, swelling of papilla equal to about 2.5*mm*, numerous hemorrhages and exudates throughout fundus. Temperature normal. Knee and ankle reflexes diminished. Sleeps well, appetite good. Treatment, mercurial inunctions and increasing doses of K. I. to 90 or 100 gr. t. i. d. Condition remains the same. L. is in doubt as to the etiology, but thinks it due to cerebral trouble.

Dr. Pooley thought the symptoms indicated cerebral tumor, and until it increased in size enough to produce some paralysis of extrinsic muscles it would be obscure. In double choked disc the cause was one which produced increased intracranial pressure.

Dr. Webster referred to two similar cases. In one case the autopsy showed cerebral meningitis and not tumor; while in the other the autopsy showed a large glioma of the cerebellum. He

thought that brain tumor should be given as the cause of the symptoms in Dr. Lewis's case.

Dr. LESZYNSKY remarked that the symptoms vary in these cases. You may have small cerebral changes with great disturbance in ocular symptoms, or extensive cerebral changes and slight ocular disturbance. Considers case to be an intracranial growth.

Dr. THOMSON presented a **case of lenticular opacity due to injury clearing up.**

Dr. POOLEY had never seen a traumatic opacity the size of this one clear up as much apparently as this has done. He would be guarded in his prognosis, as he had seen many clear up immediately after injury, whereas vision failed later and eyes became phthisical.

Dr. CHAMBERS thought that the eye would get blind later by detachment of the retina.

Dr. OATMAN showed a **case in which Tenon's capsule was filled with a paraffin ball after enucleation.** He said the enucleation was performed in the usual manner with the following modifications. A long guide suture was passed through each of the four recti muscles before they were cut, so that they could be easily found when required. The hemorrhage was easily controlled by packing the cavity with gauze. After inserting the paraffin ball, the two vertical muscles were united by a single loop suture. The suture included both muscle and conjunctiva. The guide suture was now removed. The two lateral muscles were united in the same manner, and the entire wound closed by sutures. It will be noticed that no sutures were buried. The reaction was rather less than he is accustomed to observe after enucleation. A much larger ball could have been used with advantage, but this was the only size at hand. The stump has good motility.

Dr. LAMBERT thought that the motility of the stump was about the same as that resulting from ordinary enucleation.

Dr. LEWIS stated that Snellen's eyes gave him good results, as regards getting better motility than the ordinary glass eyes.

Dr. MITTENDORF said that Snellen's eyes were very thick at inner corner, and that they do not set well in the conjunctiva in that position, and that some of his patients objected to wearing them on that account.

Dr. DUANE presented a **case of extirpation of the lachrymal sac, done in the stage of phlegmonous inflammation.**

History of epiphora for ten years. The phlegmon had been twice opened, once by another surgeon, once by himself; but as it showed a constant tendency to reform, and as its treatment promised to be tedious he concluded to extirpate the sac. This was done eleven days after the outbreak of the phlegmon. The collapsed sac was distended with iodoform gauze, passed in through the original incision. This facilitated the subsequent dissection. The canaliculi were not obliterated, nor was the lachrymal gland taken out, but the nasal duct was thoroughly curetted. Internal canthal ligament not divided. Primary union with almost invisible scar. Epiphora only on exposure to wind, and then but slight. One slight attack of conjunctivitis since operation, which was done in July, 1902.

Dr. POOLEY remarked that he had practically ceased probing in chronic cases. He favors extirpation of the sac, especially in these cases before cataract extraction.

Dr. THOMSON referred to two cases, one chronic and one acute, on which he operated after the Holmes method with good result.

Dr. TYSON stated that he operated according to the Knapp method; in addition he closes the punctum of upper and lower lids with a galvano-cautery point, and had obtained much better results than without the latter procedure.

Dr. POOLEY presented a **specimen of leuco-sarcoma of the choroid,** and gave a history of the case.

Dr. THOMSON said that the onset of the glaucomatous symptoms did not depend so much upon the size as upon the location of the tumor, especially if it was near enough to the venal vorticosæ to press upon them.

Dr. LAMBERT referred to a case in which the symptoms resembled those in the case under consideration, and in which a small choroidal tumor was found located behind the equator of the eye with detachment of the retina.

Dr. SEABROOK **read a paper on amber-yellow glasses for the examination and treatment of eyes.** He referred to the present activity in the study of photo-therapy in general and the apathy of ophthalmologists in this particular. He then called attention to the action of amber-yellow glass as a ray filter for white light, allowing the light rays to pass through freely, the heat rays partially, and eliminating the actinic rays, the last being the element of white light which causes chemical inflammation and irritation of eyes. He also mentioned that yellow is used as

a standard for determining the index of refraction, and that yellow glass corrects the chromatic aberration of eyes, and dulls dazzling reflections by cutting off the blue violet rays. Amber-yellow glasses No. 2 are nearly equivalent in spectroscopic analysis to glass stained by a saturated alcoholic solution of tropalolin ooo, which is a perfect filter for the actinic rays. The glasses are graded like blue or "smoked" glasses, No. 1 being the lightest; No. 2 had been mostly used by him up to the present time. A lens of 2½-inch focus had been used for oblique and indirect examination, made by splitting a white lens and introducing a plain amber-yellow glass. This lens, a "Loring" ophthalmoscope with an adjustable amber-yellow glass to go over the mirror, and No. 2 spectacles were exhibited to the section. In examinations with the yellow glasses it had been found that the iris contracted less than with the usual light, and that the light was more agreeable to the eyes than white light, congestion, lachrymation, and photophobia being less in inflamed eyes when it was used. Healthy eyes being tested with No. 2 glasses, vision was found to be neither improved nor diminished in less than 5 %. The color was always pleasant to the retinæ. The blue and violet spectral rays are eliminated from the atmosphere and sometimes from objects colored with pigments, while others, as light blue, followed more the laws of the mixture of pigments.

The glasses are indicated in cases of neuralgia about the eyes and retinal hyperæsthesia evidently due to light irritations, but care should be taken regarding steady use in chronic cases of neurasthenia. In cases of keratitis, vision seems to be improved in acute central cases, not in chronic peripheral ones; symptoms of irritation are benefited. The effect upon irregular lenticular astigmatism in cataract is similar to that in irregular corneal astigmatism. Cases of chorio-retinal disease showed improvement of vision with amber-yellow glasses. Three cases of glaucoma were reported, in two of which, one having nyctalopia from nicotinism, the chronic irritation from light had been entirely relieved by yellow glasses where "smoked" glasses were a failure. Probable benefit to be derived from amber-yellow glass as a protection for eyes from the electric light, and the wards of eye hospitals were then mentioned, and the possible benefit to patients with the most frequent forms of summer catarrh — conjunctivitis with papillæ, follicules, or phlyctenules, and photophobia and lachrymation.

In conclusion it was stated as a summary that amber-yellow glass protects eyes from irritation and improves vision.

Dr. LAMBERT stated that he had no experience with amber-yellow glasses, excepting those used as landscape glasses of that color.

Dr. POOLEY referred to an albinotic case, a man of seventy years of age, who made the observation himself that the amber-colored glasses gave him more relief than any others he had ever tried.

Dr. DUANE has prescribed amber or yellow shades for persons working in electric-light factories; and he mentioned the fact that two Russian observers some time ago advised using amber glasses after extraction, and they noticed that the visual acuity was improved in some cases for long-range seeing—*e. g.*, shooting, etc.

MEETING OF MAY 18, 1903. DR. A. DUANE, CHAIRMAN.

Dr. H. W. WOOTTON presented some **cases showing the definitive results produced by advancement without tenotomy in strabismus,** and gave histories of respective cases. The results, as observed in patients presented, were uniformly good.

Dr. E. GRUENING presented a **case of removal of angioma of the brow without removal of the skin.** Patient was a child, three years old, who had a large cavernous angioma excised from the brow, lid, and orbit. It had been operated upon a number of times previously with the actual cautery. Dr. Gruening made his incision along the brow, using a T-shaped clamp to prevent hemorrhage. After excising the angioma and freeing the skin of the blood-vessels, he replaced the skin and sutured it in place. The blood-vessels have not reappeared.

Dr. H. KNAPP said the principle of removing vascular tumors with knife or scissors was not new, and he had extirpated such tumors from his earliest surgical attempts. These tumors have a capsule, and the palpebral ones lend themselves most easily to extirpation because they can be clamped. He remembered two such cases very well on account of the apparent difficulty to remove them, and the surprisingly good results they yielded owing to a modification of the operative method. The first was a baby of about six months. It had a cavernoma of the inner half of the upper lid, a small one at the inner portion of the lower lid, and a third one at the nasal side of the orbit. These tumors communi-

cated with one another by small vessels. Prof. O. Weber (the distinguished professor of surgery at Heidelberg, well known by his treatise on *Surgical Pathology*, which appeared about 1865), whom he consulted, said it might be necessary to remove the whole tumor mass, and eventually take out the eye. The parents would not consent to this plan, nor did it particularly appeal to him. He first removed the tumor of the upper lid, after having clamped it; then he everted the lid, exposing the orbital portion of the tumor, introduced a horn-plate along the eyeball and pressed it behind the tumor fast on the inner wall of the orbit to compress the afferent vessels, and then extirpated the mass with forceps and scissors; there was no particular bleeding. He left untouched the smaller and flatter tumor on the lower lid. This tumor gradually shrunk without leaving a trace. The second case was a facsimile of the first. Dr. Gordon Buck, of this city, had it in charge, and told the mother the growth should be destroyed with the galvano-cautery. He met him in consultation and told him of the case he has just spoken of. Dr. Buck approved of the plan and Dr. Knapp was asked to do the operation. It was done successfully. A year or two ago, a woman of about thirty years, with a splendid physique and a particularly fine countenance, came to his office, and said her mother, who had been a former patient of his, had requested her, when she came to New York, to call on him and thank him for having saved her from a great disfigurement. He has repeatedly put in practice the principle of destroying the afferent vessels in vascular tumors, teleangiectasias particularly, after which the tumors gradually disappeared.

Dr. POOLEY thought that Dr. Gruening's method of operating was different from Dr. Knapp's, in that he reflected a thin flap of skin, then shaved off and extirpated the mass, and replaced the skin flap. He said he remembered the second case of Dr. Knapp, having assisted him during the operation.

Dr. LINN EMERSON read a **report** of a **case of extensive laceration of the sclera,** with presentation of specimen. Patient was a child, two years of age, who fell upon a broken teacup, inflicting a large, ragged, triangular wound in the temporal region, extending deep into the orbit. Lids and outer canthus were intact, anterior chamber filled with blood; T — 3. Attempt to suture the globe before enucleation failed, as posterior part of wound could not be reached. Collapsed globe was enucleated. Specimen shows rupture extends almost from cornea to optic nerve.

Dr. H. H. Tyson presented a **case of traumatic bilateral ophthalmoplegia** (complete on one side), **with recovery in one eye and slight improvement in the other.** The patient, a Greek, occupation, maker of tin boxes, while at work on or about March 22, 1903, had his head caught and compressed in the machinery, and was struck just below the infraorbital margin of his right eye, with an iron tooth, a part of the machine. He experienced the symptoms of basal fracture, such as loss of consciousness, extensive hemorrhage from nose, mouth, and eye, paralysis of the ocular muscles, loss of vision, and severe headaches. Both eyes were immediately closed, being swollen, the right one the more prominent. He was unable to move them. Eight or nine days later he was able to open his right eye, but vision was poor but gradually improved. He noticed almost immediate loss of sight in left eye after the injury. On April 24th he was examined at the clinic of the New York Ophthalmic and Aural Institute: right eye, vision $\frac{15}{30}$, slight optic neuritis, motility slightly restricted outward; left eye, complete ophthalmoplegia, with atrophy of optic nerve. Vision nil, pupil dilated, no reaction to light, accommodation, or consensually. Eye absolutely fixed and not a particle of motility remaining. No history of syphilis or evidence of constitutional disease. Diagnosed as fracture of the base of skull, involving the optic foramen and sphenoidal fissure in left orbit with a fracture of the floor and inner wall of right orbit, the loss of function in right eye being due principally to hemorrhage, while in the left eye the cause was hemorrhage and fracture, especially the latter. Treatment consisted of potassium iodide, under which great improvement was noticed. St. pr., right eye: vision $\frac{15}{15}$ +, motility normal, fundus normal. Left eye: faint light perception, pupils responded to accommodation-convergence and consensually. Ptosis less by half, and slight motility inward and upward. No apparent change in fundus from previous examination. The interesting facts were the completeness of the paralysis in his left eye at the beginning, with quite encouraging improvement in the left eye as regards motility and appearance, and the complete recovery in his right eye.

Dr. Julius Wolff presented a **case of optic-nerve atrophy,** with following history. S. H., æt. forty-three years, always had good health. No specific or alcoholic history. Right eye has diverged as long as he can remember, and was almost totally

blind. Vision in left eye poor, and has not changed any for years. Examination by neurologist negative. Right eye, vision p. l. faint; left eye, vision with + 3 cyl. ax 15 T = $\frac{1}{60}$. Field of vision constricted by only 5°–10° for white. Fundus right eye, marked atrophy of disc, apparently not post-neuritic. Vessels normal; left eye, atrophy of disc present but less marked than in the right. Medullated nerve fibres above disc also atrophied. Skull has peculiar shape—peak or tower skull. Atrophy of optic nerve has been found repeatedly in connection with such cranial deformity, and is due either to too narrow optic foramen, or to meningitis accompanying premature ossification of basilar sutures of skull, resulting in tower skull.

Dr. C. KOLLER presented a **case of partial xerosis of the conjunctiva of upper lid.**

On account of the absence of Dr. CALLAN, Dr. SKEEL presented a **case of removal of a piece of steel from the iris without an iridectomy.** The operation consisted of making an incision in the cornea with a keratome; the iris with foreign body prolapsed through it. The piece of steel was then removed with the Hirschberg magnet, the iris was replaced, and the wound healed nicely. The iris was adherent to the lens for about six days, but was now free and lens was uninjured. Vision, $\frac{20}{30}$.

Dr. SARIL showed **trachoma forceps** with serrated ridges on fixed plate instead of rollers.

Dr. C. J. KIPP **read a paper—"The mental derangement which is occasionally developed in patients in eye-hospitals"** (published in extenso in these ARCHIVES, p. 376).

Dr. H. KNAPP said Dr. Kipp's collection of cases was a valuable contribution to this rather singular mental derangement, which seems to be met with more in ophthalmic than in other surgical hospitals. Dr. Kipp's cases refuted all nosological hypotheses that have thus far been advanced. His views seem plausible, well supported by his cases, yet the material was not sufficient to be adopted unreservedly. Dr. Knapp reported a few cases, to illustrate three categories. I. The **light variety.**—A lady of about fifty-five, vigorous, restless, self-willed, impulsive, brave, accustomed to all the comforts of a luxurious residence, entered the hospital reluctantly. She stood the simple extraction without flinching and made a good recovery. On the third day, she rebelled; she got out of her bed, dressed somewhat, and declared she would not stay any longer, saying her stay had no object any

longer — the eye had never given her any trouble—she could see as well as ever, and she did not see why she was kept there. Dr. K. was in the hospital and went to see her at once. He found her sitting on her bed, determined to leave. He sat down before her, and told her that it was not yet time for her to leave. He knew the cause of her excitement; she was losing her mental balance, a kind of temporary insanity, which was not very rare in patients operated for cataract. She protested and insisted on going. He told her, as her physician, he could not let her go, she jeopardized the good results of her operation. She had promised to stay the two weeks necessary for the recovery from a cataract operation. He could assure her from manifold experience that this singular insanity was transient, in a day or two her mind would be as well balanced as it had been before. She listened with astonishment and calmed down. He told her to let the nurse undress her and put her to bed again; he would go out of the room and come back in a quarter of an hour. She yielded, went to bed, and when he returned she was quiet and said — "Doctor, you are right, I was foolish. I thank you for your kind words. I shall not act that way any more; I shall stay, and as soon as you can operate on my other eye, I shall give it you, and shall stay as long as you desire." The attack was over, she had no relapse and left on the fourteenth day with an ideal success. Another mild case was that of a man seventy-nine years of age, very wealthy, a good business-man. Extraction without accident; the first two days quiet; in the third night, at twelve o'clock, he was called by a messenger to come at once to the hospital, Mr. E. was out of his mind and wanted to go home. When he arrived he found him dressed in calling attire, his silk hat on, pacing his room, with both eyes unbandaged. He greeted him cordially and thanked him for the excellent cure of his eye; he could see with it, and he had had no pain or ache. He was perfectly well, and he was sure the Doctor would not object to his changing the hospital quarters for his house, which was not far away. He (Dr. Knapp) told him: "You are a business man, a good, prosperous, and judicious man." He said he was proud of having that reputation. He (the Doctor) said: "This is not an hour for you to go home, let us sit down and talk business. You have considerable real estate, some in the vicinity of the College of Physicians and Surgeons. The trustees have their eyes on it." "They can have it, if they pay for it," he answered. They talked half an hour, then he told him that he

was sleepy and wanted to go to bed, and it was time for him to retire also. He had become quiet, the attack was over, and he had no recurrence.

II. The **violent variety.**—Of that he related the recovery of one of his Heidelberg patients. It was the Mayor of the city of Worms. On the third day after the extraction, he became deranged and showed the picture of the most violent maniacal attack. It took four strong male nurses to prevent him from doing mischief to himself and others. He was rabid, particularly to him; would have him put in prison for keeping a free and peaceful man, a citizen of no mean town, incarcerated like a criminal, etc. He quieted down the second day and was all right the third.

III. A **third group** comprises the **chronically unbalanced,** with a **suicidal tendency.** Of these he had had two: one, an old man, instrument-maker, who, on the fourth or fifth day after a successful extraction, told him, during the change of the dressing, that he was very sick. The Doctor would not see him any more to-morrow. He spoke comfortingly to him, and when he was out of his room he told the head nurse: "That man must have a nurse at his bed the whole night." The Doctor continued his round and when he had scarcely entered a room on the next floor, the patient had thrown himself over the banister of the winding staircase down to the first floor and was instantly dead. A second case was that of a lady of about fifty years, who had the craze that her relatives wanted to shut her up in an insane asylum. She had undergone a successful extraction with a smooth recovery. When prior to her departure two of her relatives were in the parlor, together with her private nurse, who had constantly watched her, and then left the parlor for a few minutes, the patient went out quietly, ran up the four flights of stairs unsuspectedly, threw herself over the banister and fell dead on the first floor.

When the first patient had committed suicide, Dr. Knapp had a brass-railing of 1.5 foot in height put on the banister at every floor landing of the staircase, so that nobody could throw himself over. The last patient, with cunning energy, had swung herself over the banister near the brass addition. It is well known that suicides occur in every hospital in spite of the most careful watching.

These two were the only ones that occurred in the New York Ophthalmic and Aural Institute among 15,091 inmates treated during the thirty-two years of its existence.

To recapitulate: Mental derangement in hospitals occurs in three categories:

(*a*) **Light cases,** slight mental disturbance; in **eccentric** and **odd** characters. These cases can be quieted by plain or kind talk—best by the operator,—so that the attack does not develop further.

(*b*) **Violent mania.**—For those he knows no treatment except anodynes and watching by strong attendants.

(*c*) Persons of **mild melancholic disposition with temporary aggravations and suicidal tendencies.** This group requires the greatest attention during their whole stay in the hospital. Dr. Knapp is inclined to think that in all those cases there exists a previous mental unbalance, though it may be difficult to recognize. It is well known that the state of incubation of insanity may last a lifetime. Whether this hypothesis is founded or not, the existence of this singular psychosis after operations inculcates the rule to include the mental condition of our patients into the pre-operative examination. Dr. Kipp, in his cases, has examples which are at variance with all conditions that have been suggested as the causes of this post-operative mental disturbance. He thinks that they may be due to homesickness (nostalgia). It would be desirable to enquire whether these disturbances have ever been observed in patients operated on in their homes.

Dr. E. GRUENING never had any cases of mental derangement after operating. He prefers that his patients occupy their room in the hospital for two days before operation.

Dr. POOLEY had seen several cases and thought that the trouble was due to nostalgia.

Dr. TYSON referred to four mild cases which he had seen, three of which had been operated upon at the hospital, and one at the patient's home. All the cases made good recoveries, both as regards their sight and mental equilibrium. While he thought that nostalgia might be a contributing cause, he did not think it the main one; but was disposed to consider a previous dormant tendency to mental derangement as existing in these cases. He said it had been customary for years at the New York Ophthalmic and Aural Institute to have the patients occupy their rooms at least a day previous to operation.

Dr. LESZYNSKY agreed with Dr. Kipp's conclusions as to the change in environment being the predisposing cause in most cases.

REPORT OF THE MEETING OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

By C. DEVEREUX MARSHALL, F.R.C.S.

FRIDAY, MAY 8, 1903. W. LANG, F.R.C.S., PRESIDENT, IN THE CHAIR.

Drs. A. PAINE and F. J. POYNTON read a paper on **rheumatic iritis,** in which they endeavored to establish the identity of the pathological changes in rheumatic iritis with those occurring in other accepted rheumatic affections. The diplococcus of rheumatism developing in the tissues and cells rather than in the fluid exudate rendered the identification of micro-organisms in fluids obtained by paracentesis of the anterior chamber unsatisfactory, while the opportunities of examining the iris in the acute phase of the inflammation in the human subject did not often occur. The specimens therefore of iritis exhibited which showed the diplococcus in situ had been produced in the rabbit. The distribution of the organisms was similar to that occurring in synovial membranes showing dense clumps.

Observations were made by the President, Messrs. HARTRIDGE and HOLMES SPICER in regard to the extreme rarity of iritis as a complication of true acute rheumatism, and to the probability that most of the so-called cases of rheumatic iritis had really their origin in gonorrhœa.

Dr. POYNTON in reply said that the special micro-organism when present was easy to find, but he was not sanguine about finding them in portions of iris removed in the quiescent period, as the subsidence of active inflammation was dependent on their destruction or reduction to a state of latency.

Mr. W. H. H. Jessop described **two cases of tuberculous choroiditis associated with conjunctival tubercle.** The first was that of a girl aged nine, who had a round smooth mass on the conjunctiva which reached nearly to the limbus of the cornea. This was incised and tubercle bacilli were obtained from it. The retina was detached with two masses obscuring the disc. The eye recovered with vision of $\frac{6}{18}$.

The second case was a woman aged twenty-three who had tubercular disease of the breast and a strong family history of tubercle. While under observation, masses in the choroid were seen to spread from the centre towards the periphery, leaving but little trace behind them, and now, upwards of three years after, the patient has recovered with good vision.

Mr. Sydney Stephenson said that tubercle of the choroid, like some other conditions regarded as rare, ceased to be so when systematically looked for. Among 119 cases of tuberculosis he had examined in surgical wards, he had found about 10% in which the choroid was affected. He endorsed Mr. Jessop's observations as to the absence of residual pigment and vitreous opacities.

Mr. Juler mentioned one case that had recovered under local treatment alone. Remarks were also made by Messrs. Johnson Taylor and Holmes Spicer.

Mr. A. F. MacCallan reported **five cases of glaucoma in which adrenalin caused increase of tension.** The increase of tension occurred in all the cases consequent on the use of adrenalin in eyes which had already had marked symptoms of glaucoma. Except in these cases, this was not the invariable consequence of the use of adrenalin, but the writer had seen two cases in which retinal hemorrhage had occurred after its use. Other cases in which it had been used showed no change in tension or in the fundus, but the vascular constriction produced by adrenalin appeared to prevent the absorption of other drugs such as myotics.

Mr. Jessop spoke of the pain and increased tension produced by adrenalin in scleritis and episcleritis. He found that engorgement followed constriction of the vessels.

Mr. J. H. Parsons thought that the effect of adrenalin was by no means uniform. Complications following its use were probably due to dilatation of collateral or deep-seated vessels and reactionary dilatation of the superficial ones after the initial contraction had subsided.

Remarks were also made by Messrs. Harman, Holmes Spicer, and Johnson Taylor.

Dr. E. DONALDSON communicated **a case of proptosis and deformity of the head** in a male child aged two and a half years, the youngest of three. The eye had several times become dislocated forwards. There was no defect in other special sense or in intelligence. There was slight horizontal nystagmus, but the lids covered the eyes during sleep. There was no pulsation, but the globes could not be pressed back. So far as could be made out with the finger, there was no deformity of the orbital plate. The vision was defective, the optic discs being pale, but the corneæ were clear. The case was similar to one shown to the Society in 1894, the shallowness of the orbits being due to premature synostosis, as pointed out by Swanzy.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY IN THE SECOND AND THIRD QUARTERS OF THE YEAR 1902.

By Dr. G. ABELSDORFF, in Berlin; Prof. ST. BERNHEIMER, in Innsbruck; Dr. O. BRECHT, Prof. R. GREEFF, Prof. C. HORSTMANN, and Dr. R. SCHWEIGGER, in Berlin:

WITH THE ASSISTANCE OF

Dr. A. Alling, New Haven; Prof. E. Berger, Paris; Dr. Dalén, Stockholm; Dr. J. Herrnheiser, Prague; Prof. Hirschmann, Charcow; Dr. J. Jitta, Amsterdam; Dr. Krahnstöver, Rome; Mr. C. Devereux Marshall, London; Dr. P. von Mittelstädt, Metz; Prof. Da Gama Pinto, Lisbon; Dr. Heinrich Schulz; and others.

Translated by Dr. Ward A. Holden.

(*Continued from page 309.*)

X.—ORBIT AND ACCESSORY SINUSES.

302. **Le Blanc.** A case of secondary ôsteomyelitis of the orbital walls. *Inaug. Dissert.*, Berlin, 1902.

303. **Loeser.** A contribution to the subject of metastatic abscess of the orbit (bacterium coli). *Zeitschr. f. Augenheilk.*, viii., 1, p. 24.

304. **Purtscher.** A case of metastatic ophthalmia. *Centralbl. f. prakt. Augenheilk.*, xxvi., p. 257.

305. **Goldzieher.** On syphilis of the orbit. *Sammlung zwanglosen Abhandlungen aus dem Gebiete der Augenheilk.*, iv., Marhold, Halle, 1902.

306. **Reynier.** Traumatic arterio-venous aneurysm of the right cavernous sinus. Inefficacy of ligation of the common carotid. Treatment with gelatine serum, resulting in recovery. *Bull. d. l. soc. de chirurg. de Paris*, Mar. 19, 1902.

307. **Fromaget.** Fibro-chondroma of the orbit. Extirpation through the upper cul-de-sac, with preservation of the ball and the vision. *Arch. d'opht.*, xxii., 6, p. 380.

308. **Israel.** Operation for orbital sarcoma with preservation of the eye-ball. *Centralbl. f. prakt. Augenheilk.*, xxvi., 4, p. 108.

309. **Hirsch.** Two cases of exophthalmus: 1. Sarcoma of the orbit. 2. Retrobulbar hemorrhage. *Arch. f. Augenheilk.*, xlv., 4, p. 283.

310. **Causé.** Cases of intermittent exophthalmus and varicose dilatation of the veins about the eye. *Inaug. Dissert.*, Giessen, 1902.

311. **Reuchlin.** A case of bilateral pulsating exophthalmus. *Inaug. Dissert.*, Tübingen, 1902.

312. **Coppez.** A case of disease of the ethmoid sinus. *Soc. belge d'opht.*, Apr. 26, 1902.

313. **Oliver** and **Wood.** Orbital abscess associated with antral and ethmoid disease. *Amer. Journ. Med. Sciences*, July, 1902.

314. **Friedenwald.** Cavernous angioma of the orbit. *Amer. Journ. of Ophth.*, Apr., 1902.

315. **Thompson, E. S.** An unusual case of subperiosteal hemorrhage of the orbit following an uncomplicated delivery. *Pediatrics*, Mar. 15, 1902.

The case described by Le Blanc (302) began with a superficial and mild cauterization of the lid with acid. From this an erysipelas developed with deep abscesses of the cheek and orbit, which, following a recurrence of the erysipelas, attacked the bone, so that the pars orbitalis, the greater portion of the body of the zygoma, and the inferior wall of the orbit were found to be sequestrated and were removed. A fistulous tract remained open for over a year. The optic nerve was atrophied, which the writer attributes rather to a thrombophlebitis than to the slight optic neuritis. In order to explain the affection of the bone the writer assumes that there was osteomyelitis, a periostitis following an orbital abscess not being sufficient to cause so much destruction.

Loeser (303) describes an abscess of the orbit, an affection that is rare in comparison with phlegmon. The patient, a woman, had suffered long with gout and gall-stones. An attack of gall-stone colic with chills and fever was supposed to be the source from which the metastasis in the orbit arose. Some days later an iridocyclitis came on with great pain, and in a week the pupil was blocked, there was chemosis of the conjunctiva, and slight protrusion and limitation of mobility, without much redness or swelling of the lids. Two weeks later a small corneal infiltration appeared, leading to a ring abscess and perforation of the cornea without the escape of any pus. Pus had in the meantime exuded from the orbit and in it the bacterium coli was found. The actual

nature of the affection thus manifested itself late. Loeser believes that an embolus of the ophthalmic artery extended to the bulbar and orbital branches, and that the inflammation in the ball was a chronic one and that in the orbit an acute suppurative inflammation.

The clinical interest in PURTSCHER's (304) case lies in the observation of the first stage, and in the combination of purulent ophthalmia and orbital abscess, and further in the fact of masses of pneumococci being found in the pus of the vitreous.

In his systematic treatise on syphilis of the orbit, GOLDZIEHER (305) calls syphilitic periostitis the point of origin from which most of the different syphilitic affections of the orbit proceed. It is much rarer than changes in the surrounding bone, which, however, are constantly found in orbital disease and are of great importance from the point of differential diagnosis. Osteoscopic or pressure pains are also a clear evidence of syphilis. From the periostitis, which begins mostly at the orbital margin, the disease develops along the fascia of the orbit. From the foci at the margin of the orbit and also from those in the orbit, fistulas arise which leave scars less indrawn than those caused by tuberculous disease of the bone. It is noteworthy that together with the periostitis and gummata in the orbit other organs become involved. Therapeutically only the most energetic mercurial and iodide treatment is of any avail, and often this is unsuccessful.

REYNIER (306) reports a case of arterio-venous aneurysm of the right cavernous sinus in which the ligation of the common carotid on that side produced no improvement; the injection of gelatine-serum, proposed by Lancereaux and Paulesco for aortic aneurysm, brought about a complete disappearance of the exophthalmus and tinnitus, although a diminution of vision remained.

BERGER.

FROMAGET (307), after splitting the outer commissure, removed through the conjunctiva a fibro-chondroma as large as a chestnut, which had developed in the course of eight months in a girl of eighteen, between the muscle funnel and the roof of the orbit, and had pushed the eyeball forward and downward and outward. Immediately after removal of the tumor the ball took its natural position again, and the result was satisfactory save for a moderate ptosis and some diplopia. v. MITTELSTÄDT.

In a case of exophthalmus of 25*mm* that had developed in the

course of five years and had been preceded seven years before by unilateral pain in the head and ear, ISRAEL (308) removed the growth, which was thought to be a sarcoma, by Krönlein's method. He began the incision in the skin at the level of the supraorbital margin and carried it down between the external canthus and the orbital margin. From the upper end of the incision he carried another horizontally along the upper margin of the orbit to its middle. The lid was then dissected up without disturbing the levator, and turned toward the nose. The tumor was readily removed, although it had perforated the roof of the orbit. It filled the entire orbit. Microscopically it proved to be a fibro-sarcoma. Some ptosis remained. There had been no diplopia before the operation.

The writer believes that his method, without the interference with the bone according to Krönlein's method, gives one better access to the orbit than Knapp's method. It would be better to cut through the levator and suture it later than to stretch it unduly. Orbital sarcomas are often encapsulated and have no tendency to return ; the diffuse tumors of the orbit are malignant.

In HIRSCH'S (309) first case the lachrymal sac was removed in January on account of suppuration, and the soft bone of the infra-orbital margin was curetted until an opening was made into the antrum of Highmore. In November the softened portions of the superior maxilla near the orbit were removed, as were also tumor masses from the ethmoid and sphenoidal sinus. A year later another operation was undertaken, after which the patient died. For a year the floor of the orbit was wanting yet the eye remained useful. The masses removed at the second operation proved to be chondro-sarcoma. The writer believes that the lachrymal-sac trouble gave rise to the sarcoma.

The orbital hemorrhage (Case 2) Hirsch believed to be due to a rupture of a branch of the ophthalmic artery in consequence of venous stasis in excessive exertion. There was perfect recovery without special therapy because the patient had refused an operation for suspected orbital tumor.

After a consideration of the literature, CAUSÉ (310) offers two new observations of intermittent exophthalmus — that is, cases in which when the body is bent forward or the jugulars compressed an exophthalmus appears. With this displacement, due to varices in the orbit, the orbital fat atrophies and the fasciæ become loosened, so that finally the eye occupies its normal position only

when the body is erect or thrown backward. In a case that came under treatment early, a pressure bandage and care of the body brought about complete recovery and in another case partial recovery.

REUCHLIN's (311) patient was thrown against a post, striking the back of his head. He became unconscious, vomited, and then noticed noises all over his head. On the third day, chemosis appeared in the lower half of the right conjunctiva, with ptosis, exophthalmus, and muscular paralyses on each side. Six weeks later, chemosis came on in the left eye, vision diminished, and on each side were ptosis and pulsating exophthalmus; even the chemosis pulsated. Over the entire skull were heard sounds synchronous with the pulse. A diagnosis of injury of the carotid in the cavernous sinus was made. Compression of the right carotid lessened the pulsation on the right side. The effect of this compression was increased by long rest in bed and the retinal veins became thinner. The sight in the right eye, however, was lost entirely. Compression of the left carotid only diminished the vision in the left eye. The chemosis continued. Finally ligation of the right common carotid was considered.

From a study of the literature, continuing the tables of Sattler and of Keller, it appears that after ligation there is recovery in 68 % of cases, no result in 21 %, and death in 9 %; in digital compression cases, in 22 %; electrolysis is equally uncertain, and the ligation of the ophthalmic vein is better.

COPPEZ (312) observed a remarkable case of inflammation of the ethmoid cells, which had developed in a boy of thirteen after a coryza. In another clinic where the patient had been treated previously a diagnosis of empyema of the antrum of Highmore was made, but puncture did not lessen the symptoms — exophthalmus and diminution of vision,— nor did any pus escape. Transillumination revealed a lack of translucency in the frontal sinus and antrum on the affected side. Since the rhinoscopic examination and the deviation of the eye outward indicated an affection of the ethmoid, all the sinuses were opened, when it was found that the frontal sinus and the antrum were normal, while there was pus in the ethmoid cells. After the removal of a large necrotic portion of the latter, recovery took place in a week. BERGER.

OLIVER and WOOD (313) relate the case of a girl, thirteen years old, who after suffering from toothache developed pain in the left

eye, swelling of the lids, proptosis, and divergent strabismus. $V = \frac{6}{200}$. There was a thick discharge from the left nostril. Later a hard mass could be felt in the inferior nasal portion of the orbit. The antrum, when opened through the canine fossa, contained some soft tissue and a little pus. It became necessary to open an orbital abscess, which was found to involve the ethmoid cells. The patient recovered from the ocular symptoms. Interest centres in the question whether the original cause of the disease was in the antrum or the ethmoidal cells. It is not improbable that it was in the former, which would make the case exceedingly rare. ALLING.

FRIEDENWALD (314) reports the removal in toto of a cavernous angioma of the orbit through an incision in the upper lid. Vision of the eye was preserved. ALLING.

In THOMPSON'S (315) case, one day after birth the eye began to protrude. A mass could be made out well back in the upper part of the orbit. After enucleation, several drams of blood in clots and serum came out. No fracture could be felt, although this was the most probable cause. ALLING.

XI.—CONJUNCTIVA.

316. **Falta.** On spring catarrh. *Arch. f. Augenheilk.*, xlv., 4, p. 296.

317. **Simi.** Ophthalmia due to a bug. *Bull. d'oculist.*, xxi., 4.

318. **Steffens.** The ocular conditions in erythema exsudativum multiforme Hebræ. *Klin. Monatsbl. f. Augenheilk.*, xl., 11, p. 50.

319. **Praun.** Aborted blennorrhœic conjunctivitis. *Centralbl. f. prakt. Augenheilk.*, xxvii., p. 270.

320. **Straub.** The displacement of the mucosa of the retrotarsal fold upon the tarsus in trachoma. *Centralbl. f. Augenheilk.*, xxvi., p. 137.

321. **Junius.** The pathological anatomy of granular conjunctivitis according to recent investigations. *Zeitschr. f. Augenheilk.*, 1902, viii., Ergänzungsheft.

322. **v. Arlt, F. K.** The treatment of trachoma with the citrates of copper and silver. *Wiener med. Wochenschr.*, 1902, No. 35.

323. **Kalt.** Infectious tumor of the conjunctiva, sclera, and ciliary body. *Bull. de la soc. d'opht. de Paris*, March 7, 1902.

324. **Rumschewitsch.** Two cases of hypertrophy of the semilunar fold. *Klin. Monatsbl.*, xli., p. 109.

325. **Blum, David.** On tumors of the conjunctiva with special reference to neoplasms of the caruncle. *Inaug. Dissert.*, Giessen, 1902.

326. **Stoewer.** On proliferation of the conjunctival epithelium with cystic degeneration and its relation to nævus. *Graefe's Archiv*, liv., 3, p. 436.

327. **De Berardinis.** Melanosarcoma of the semilunar fold. *Ann. di Ottalm.*, xxxi., 3, 4, 5.

328. **Rumschewitsch.** A case of adenoma of the glands of Krause. *Klin. Monatsbl. f. Augenheilk.*, xl., 2, p. 105.

329. **Meyerhof.** Cavernous lymphoma of the conjunctiva and lids. *Ibid.*, p. 300.

330. **Valude.** Conjunctival lymphoma. *Bull. de la soc. d'opht de Paris*, June 3, 1902.

331. **Cirincione.** On the structure and genesis of conjunctival cysts. Naples, Ed. Pasquale.

332. **Ackermann.** On a case of multiple cyst formation in both lower retrotarsal folds. *Arch. f. Augenheilk.*, xlvi., 1, p. 71.

333. **v. Forster, S.** A case of pathological formation of pigment in the conjunctiva. *Festschcrift zur Feier des 50 jährigen Bestehens d. aerztl. Vereins Nürnberg*, 1902.

334. **Oblath.** Congenital filiform anchyloblepharon. *Arch. di Ottalm.*, ix., 9–10.

335. **Stephenson, Sydney.** Tuberculosis of conjunctiva. *Brit. Med. Journ.*, May 3, 1902.

336. **Smith, R. W. Innes.** Gonorrhœal synovitis in an infant suffering from ophthalmia neonatorum. *Ibid.*, June 7, 1902.

337. **Bardley, J.** Tuberculosis of the conjunctiva. One case. *Ophth. Record*, July, 1902.

338. **Morrow, E. P.** A puzzling case of infection of the conjunctiva. *Ibid.*

339. **Alleman.** Amyloid degeneration of the conjunctiva. *Annals of Ophth.*, July, 1902.

340. **Bell, J. M.** A subconjunctival dermoid cyst. *Ibid.*

341. **Veasey.** Adenoma of the lachrymal caruncle, with the report of an additional case. *Ibid.*

Falta (316) distinguishes six forms of spring catarrh which he describes as follows :

First form.—No changes are to be seen in the eye. There is photophobia and in strong light slight ciliary injection. This form soon passes over into the second form. It is only the beginning of the catarrh, which probably always begins so, but usually passes soon to the more developed form, although occasionally it may persist for months and be confounded with the lymphatic ocular affections.

Second form.—This is the typical and most frequent form of the catarrh, with the well-known hypertrophy of the tarsus of the upper lid, which, as Goldzieher says, looks like chagreen. The entire region has an opalescent appearance. The conjunctiva of the lower lid and of the retrotarsal folds are either merely hyperæmic or in a state of simple catarrh. This form is frequently confounded with trachoma.

Third form.—Reddish-brown nodules appear about the cornea,

sometimes encroaching upon it. Loops from the conjunctival vessels run to these nodules. The eye is irritated, there is slight photophobia, and the iris is often hyperæmic with ciliary congestion. Rarely the palpebral conjunctiva is somewhat catarrhal, giving off a little secretion. This form is mostly readily confounded with phlyctenulæ and also with fascicular keratitis.

Fourth form.—At various points on the bulbar conjunctiva are one or two flat, fleshy-red, gelatinous infiltrations to which many vessels run. This form may be confounded with episcleritis.

Fifth form.—The simultaneous occurrence of the second and third forms.

Sixth form.—The simultaneous occurrence of the second and fourth forms. HERRNHEISER.

SIMI (317) found the cause of a severe conjunctivitis with ulceration of the cornea to be a cimex lectularius which had acted as a foreign body.

STEFFENS (318) reports on conjunctivitis in the prodromal or eruption stage of erythema multiforme which previously has only been seen by ophthalmologists abroad. It appears in the palpebral aperture in both eyes with circumscribed injection and infiltration upon which vesicles or nodules develop. The subjective annoyance is trifling, and since the eye-changes disappear with the improvement in the general condition no local treatment is required.

An eye was red in the evening but without secretion. In the morning there were excessive secretion and chemosis. PRAUN (319) found gonococci, touched the conjunctiva with 2 % silver, and instilled 10 % protargol. The following morning there was no secretion and no gonococci could be found.

STRAUB (320) finds that after trachoma the conjunctiva is movable over the tarsus and has the appearance of the conjunctiva of the retrotarsal fold. He finds also a white scar along the margin of the tarsus and recognizes in this the shrunken conjunctiva which has by traction displaced the retrotarsal fold. This shrinking is relatively not dangerous for the eye and never leads to entropium, but it shows that the retrotarsal folds should not be excised.

Citrate of copper, which ARLT (322) has rescued from the oblivion of ocular therapeutics and used in the form of a 5 to 10 % salve, contains much copper and is of slight solubility, like

citrate of silver. Therefore it irritates but little, the patient can soon return to work, and the salve may be used by the patient himself as often as three times a day. The trachoma is cured quickly without leaving scars. The remedy is not adapted for cases of lymphatic conjunctivitis, excessive secretion, large corneal ulcers, or ciliary injection. Small ulcers were found to heal readily. Preparations of iodine must not be given at the same time. When citrate of copper is not well borne, Arlt begins with itrol. The excess of this powder is to be removed from the conjunctival sac, while the citrate-of-copper salve should be well rubbed in and allowed to remain.

KALT (323) demonstrated a laborer, aged fifty, with a ring-shaped ulcer about the cornea *1cm* broad, involving the conjunctiva, episcleral tissue, sclera, and ciliary body. The corneal margin exhibited changes resembling pannus. A piece of tissue excised for diagnostic purposes was found to be composed of granulation tissue with many giant cells. No bacteriological examination was made. Morax believed that the case was one of tuberculosis, and recommended for diagnostic purposes an injection of tuberculin and inoculation of guinea-pigs with bits of the tissue. BERGER.

RUMSCHEWITSCH'S (324) cases, as the microscopic examination showed, were simple cases of hypertrophy of the plica semilunaris. Each patient was about thirty years old. In one the light rose-colored tumor measured *1cm* in height and *0.6cm* in breadth, while the free margin was about *2mm* broad. The caruncle was normal, without connection with the plica, which was also sharply limited from the conjunctiva. The plica was so large, however, that the tears ran over and the lids could be closed only in their temporal portions. It was excised without loss of blood.

In the second patient the growth in each eye extended to the cornea and the middle of the retrotarsal folds, and a sound could be passed beneath it. It was 0.5 to *3mm* thick, and caused lachrymation and deformity.

BLUM (325) has collected the published cases of tumor of the caruncle and the plica semilunaris, and classifies them according to their pathological character, and discusses their therapy and prognosis. He reports a new case of hypertrophy of the caruncle with the development of hairs; concrements were found in the sebaceous glands. Papillomata, on account of their tendency to recurrence, are to be excised deeply; the hemorrhage is then

severe. Fibromata often bleed when touched with the finger or even spontaneously. Adenomata of the caruncle are heteroplastic structures, since glands are not present normally. The writer presents one case of adenoma in a woman of fifty-seven. Angiomata, which are mostly congenital, act mechanically like the other tumors and cause lachrymation and the like. Injections are regarded as dangerous; one should excise down to healthy tissue, use the cautery, or snare off the growth. Dermoids and lipomata appear also, but remain benign. Epithelioma, carcinoma, and sarcoma, usually pigmented, also occur. In conclusion, he reports a case of subconjunctival cysticercus in the outer portion of the sclera (they generally are found at the inner angle), and a tuberculosis of the conjunctiva and the lachrymal sac which caused growths apparently polypoid, and recurred four times.

STOEWER (326) saw, in connection with a fresh traumatic conjunctivitis and an old pterygium, a 2.5*mm* thick, partly gelatinous, partly yellowish-red tumor in the inner-upper quadrant of the bulbar conjunctiva, which contained a spherical transparent cyst 2*mm* thick and some smaller ones. He excised the tumor, which had existed from childhood and caused no inconvenience. On microscopic examination, it was found to be an unpigmented nævus into which cones of conjunctival epithelium had grown and then undergone cystic degeneration.

The case of melanotic sarcoma of the plica semilunaris observed by DE BERARDINIS (327), arose from a pre-existing nævus. Recovery followed operation. KRAHNSTÖVER.

In a patient aged sixteen, who had worn an artificial eye for seven years, leaving it off only in the last six months, RUMSCHEWITSCH (328) found an egg-shaped growth in the outer half of the orbit, of pale rose color and hard consistence, 3*cm* long and 1*cm* thick, about which a sound could be passed on all sides, except for an attachment 1*cm* broad to the lateral half of the upper retrotarsal fold and an attachment 1*mm* broad to the middle of the lower retrotarsal fold. After microscopic examination, the writer regards the upper attachment of the benign tumor as the point of development from the glands of Krause. The lower attachment was doubtless due to injury by the artificial eye and subsequent adhesion.

MEYERHOF'S (329) patient was a boy of eight, with a tumor of the lids that had grown so large four months after an injury that

it appeared *2cm* thick under the upper lid, blue and translucent, soft as a lipoma, and movable under the skin but not over the tarsus. In the lower lid it was as large as an almond. In its subconjunctival portion it appeared as a yellow, translucent vesicle flattened against the ball, and in the lower cul-de-sac it had the appearance of a cock's comb. When pricked, clear yellow liquid escaped. A diagnosis of multiple lymphangioma was made and an operation undertaken. In fact, there was a pure cavernous lymphangioma of the region of the sac, palpebral and bulbar conjunctiva, and tissue beneath the orbicularis muscle, at some points almost submucous. The writer discusses in detail the literature, the various sorts of lymph tumors, their diagnosis and their prognosis. When in the conjunctiva they are often stationary, but as cavernous tumors in the orbit they may endanger the eyeball. Therapeutically it is often sufficient to prick them, use the galvano-cautery, or excise a portion of the tumor, after which the remainder shrinks or remains stationary.

VALUDE (330) presented a case of bilateral lymphoma of the upper retrotarsal folds, in which there was at the same time a swelling of all the lymph glands of the head and neck, as well as a lymphomatous degeneration of the tonsils and the posterior portion of the soft palate. Examination of the blood revealed a great increase in the number of white corpuscles. BERGER.

In CIRINCIONE'S (331) exhaustive monograph on cysts of the conjunctiva, particular weight is laid upon the acquired cysts as compared with the congenital. The writer divides the former into superficial and subconjunctival; and among the latter he records an interesting observation of cysts due to filaria inermis.

KRAHNSTÖVER.

ACKERMANN (332), who has examined microscopically the cysts of the retrotarsal fold recently described by Schmidt-Rimpler, believes that they may arise in one of two ways: (1) from å gland of Krause and (2) from the cystic degeneration of indipping of epithelium after a chronic catarrh. The fact that there was never found an epithelial connection between the cysts, even when they were small and the conjunctival covering was visible, led the writer to believe in the Krause-gland theory.

v. FORSTER'S (333) patient, a woman of fifty-two, had noticed, since 1894, small black spots in each eye. The bulbar conjunctiva was flecked with black, and the patches extended to the

fornix and at some points even into the cornea. When some of them were removed with a sharp spoon, the writer obtained membranes in which pigment lay between the cells of the superficial epithelium of the conjunctiva. The microchemical iron reaction was negative, nor could any tumor be found. The writer believed that from some organ of the body blood pigment which had lost its iron had migrated into the conjunctiva, as is seen particularly well in the conjunctiva in the case of melanotic tumors.

OBLATH (334) described a case of anchyloblepharon in an infant eight days old, in which a narrow band united the two lids 5*mm* from the inner canthus. Broadened at either end it was filiform in its middle portion and contained connective tissue and blood-vessels. KRAHNSTÖVER.

STEPHENSON (335) describes two cases of tuberculosis of the conjunctiva. The first is that of a child aged seventeen months, who had been losing flesh for four months. A lump was noticed in the lower lid and corresponding to this on the inner side was an ulcer. There was a family history of tuberculosis. The child was thin and pale, with circular ulcers on the buttocks and enlarged lymphatic glands in the neck and groin. There was a notch at the edge of the lower lid and a semicircular ulcer 7 by 5*mm* on its inner side. Several small pale elevations like miliary tubercles lay in the conjunctiva near the ulcer. Scrapings revealed tubercle bacilli. The child afterwards developed optic neuritis, with a tubercle in the choroid, and then died. An autopsy could not be obtained.

The second case was a child, aged fifteen months, with a tuberculous family history. The lid was red and thickened, and it had been discharging for several weeks. The free edge was eroded and on the inner side was a shallow ulcer 10 by 5*mm*. Scattered tubercle bacilli were found in the scrapings. The ulcer was excised and the resulting cavity filled with a graft which healed well. Microscopically the ulcer showed several miliary tubercles with typical giant cells, but the sections were too thick to allow of tubercle bacilli being found.

Stephenson thinks that tubercle of the conjunctiva is not so rare as is generally supposed, and he has found it present in about one in fifteen hundred cases. MARSHALL.

The child seen by SMITH (336) suffered severely from ophthalmia neonatorum. The mother had a vaginal discharge, and the

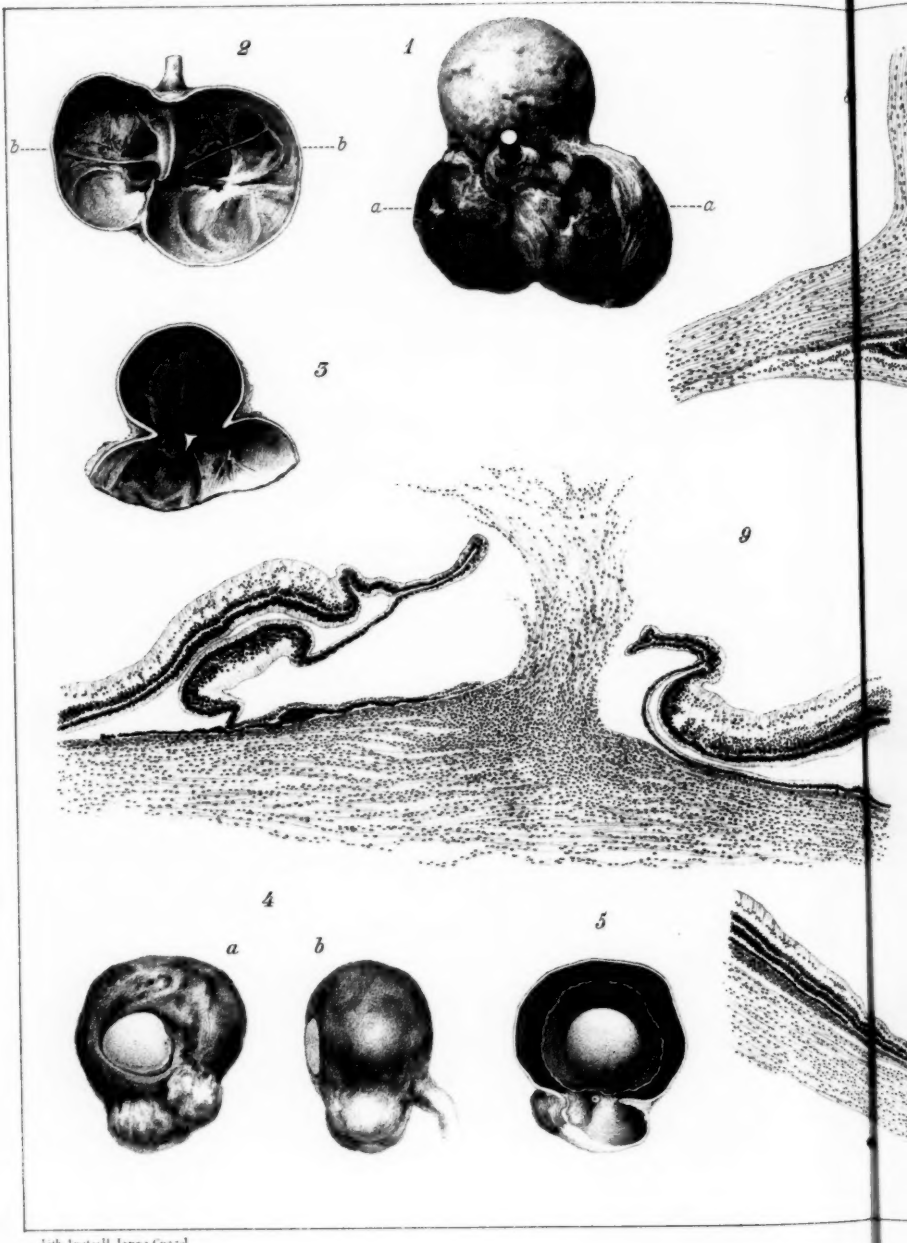
father suffered from gonorrhœa six months previously. When fifteen days old the child had well-marked synovitis of the right knee, and the case was undoubtedly one of gonorrhœal rheumatism. This disease is rare and tends to get quickly well and does not lead to ankylosis of the affected joint.

MARSHALL.

MORROW's (338) patient had intense swelling of the conjunctiva and lids, pain in the eye and temples, swelling of the parotid, and temperature 104.° After five days, the temperature subsided and smallpox eruption developed. ALLING.

ALLEMAN's (339) patient, an Italian fifty-four years old, presented enormous thickening of both lids of the left eye with narrowing of the palpebral fissure. A hard mass over which the skin moved freely could be felt in both lids. The conjunctival surfaces looked stretched over a waxy mass of yellowish-red color. The cornea was surrounded by a mass of similar appearance. Microscopic examination revealed typical amyloid degeneration originating in and around the arteries and capillaries and extending to the subjacent tissue. There was also a small amount of round-cell infiltration, with no normal structures. Trachoma was not present. ALLING.

(*To be continued.*)



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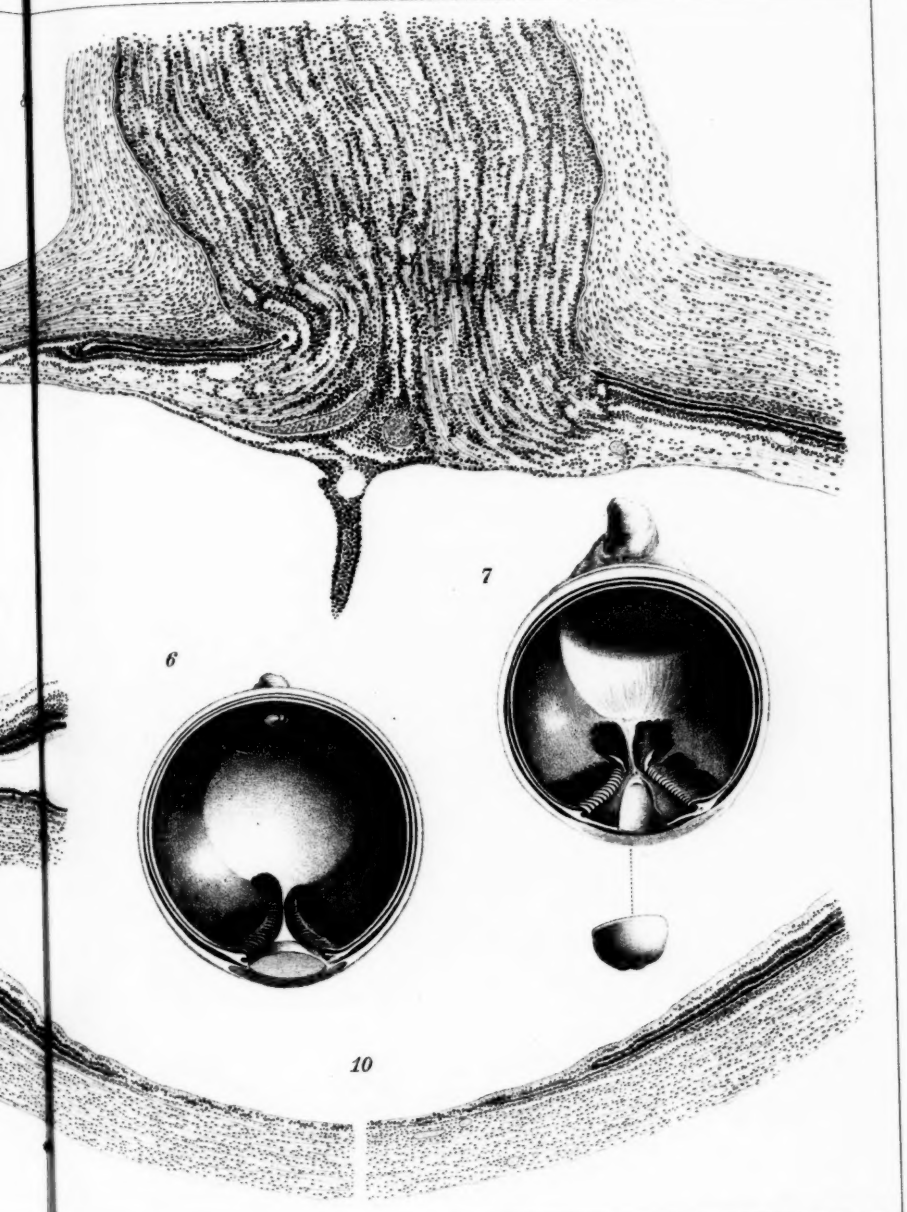

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